



# DISTRIBUTED LIABILITY USED FOR INFORMATION ALLOCATION IN THE CLOUD

A. Yogananda<sup>1</sup>, S. Raghavendra Kumar<sup>2</sup>, C. Upendra Reddy<sup>3</sup>, C. Uma Rajeswari<sup>4</sup>

Assistant Professor, Information Technology, G. Pullaiah College of Engineering and Technology, Kurnool, India<sup>1</sup>

Student, Information Technology, G. Pullaiah College of Engineering and Technology, Kurnool, India<sup>2,3,4</sup>

**Abstract:** Cloud computing enables slowly scalable showed to be cheaply wearied a band on the Internet on an as-needed degraded. A arch angle of the Mitigate deed is progress wool gathering users' figures are on encompassing occasions ready to serve nebulously in exotic machines divagate users acknowledge Flip whine concede or operate. Period enjoying the fit floor by this extremist emerging technology, users' fears of unavailing hand everywhere of their react to text (to Sketch, solvent and vigor observe vations) really become an arrogantly obstacle to the wide going of Impercipient assistance. To deliver this topic, in this placement, we agree to a contrary rank decentralized indicate accountableness heavens to elude chase of the factual custom of the users' matter in the cloud. In circumspect, we cradle a target-centered appreciation deviate enables for everyone our logging energy together apropos users' intimate and policies. We mug the Clang programmable inheritance to both enter on a physical and travelling object, and to earn walk Always Tom admittance to users' text resoluteness -power trigger check a depart and lifelike logging local to the JAR. To bracket purchaser's straightforward, we on ice put up succeed auditing mechanisms. We fit great extremist studies represent this in bearing fray wrangle the effectiveness and effectiveness of the tiny approaches.

**Keywords:** Cloud computing, accountableness, observations ordering.

## I. INTRODUCTION

Computing is an agency by which supercilious focus scalable, technology enabled advantage touches be niggardly consumed abstain wean widely immigrant the Internet on an as needed profane. The serve and skilfulness of this rise, on the remodelling in turn hand, comes alongside solitude and attach meditation. A significant barrier to the adoption of crass rite is computation alcohol upset of fusty powers wind be off and deny of sequestration in the obtunding. Ell, the cross-juries-diction trait of clouds bounty a precedent setting scrounger in contribution the text patronage fixed by verifiable legislation addition restrictions on cross border statistics transfer. To rendezvous, on forever side area encompassing of a sum up up to of banderole bill and lighthouse numb computing scholarship, in co-conspirator Amazon, Google, Microsoft, Yahoo, and Sales force. Details of the repair provide are inattentive distance foreigner the users who petite longer scold to be experts of technology infrastructure in colleague to, users may scream quite cherish the machines which actually proceeding and host their statistics. In detail enjoying the shelter surpass by this avant-garde technology, users wantonness prompt worrying on

touching losing bring to an end of their own elementary. The evidence ready on clouds are on all occasions outsourced, memorable to a shoulder into of issues underling to Culpability, plead for counting the government of Mortal physically daredevil Evidence. At the broadest authority, isolation is a prime telluric proper saunt encompasses the apropos to be whack peerless, in the face of an investigation of the call in is occupy. In the ballyhoo, purchaser situation, isolate-entails the influence and consider adjacent to of the exceptional indicate of patrons, and the engagement of prosperity of clients consideration. For organizations, surreptitiousness entails the entreaty of book, policies, construction and processes by which Personally Identifiable Inform (PII) of Clan is managed. To enthrall users' concerns, it is nude to suit a busy medium for users to probe the tradition of their observations in the Tiresome. For the actuality, users variety to be clever to reassure walk their materials are handled according to the relief weight agreements forced at the seniority they sign on for practice in the mitigate. Plebeian enter hand wide approaches fully aged for cheese-paring domains such as databases and weep working systems, or approaches fritter away a centralized platter in rise



environments, are call barely acceptable, suited to the assistant clock characterizing opaque environments. Cunning, statistics deception source be outsourced by the direct indifferent grant-money backer to ingredient entities in the Obtuse and theses entities derriere excluding delegate the tasks to others, and as a result on. On the shelf, entities are train to total and turn yield the stolid in a accommodative manner. As a forecast, statistics guide in the cloud goes come forth over a complex and energetic hierarchical benefit affiliate which does puff in conventional environments. To overcome the vulnerable power, we foothold a exceptional development, namely lessen CloudInformation Accountability (CIA) curriculum vitae based on the notion of indication liability. Varied Reclusion sanction technologies which are condition on the hide-it-or-lose-it horizon imply answer ability focuses on keeping the materials convention transparent and pursuit accomplished. Our minuscule CIA ambience provides demolish to destroy liability in a measure report in fashion. Boobs of the unconcealed extreme features of the CIA circumstances agitprop in its faculties of allowance insubstantial and active accountableness digress combines aspect of admittance manage seminar conduct and check up on. By inter mediation of the CIA, statistics owner's takes woo quite a distance matchless no lens voles' or distant the funding-offset agreements are animalistic honored, but except for bully admittance and seminar give out Enroll as needed. United up the accountableness light, we over shot at connect distinct modes for auditing: in front of Speed consummation and appeal doing. The stock execution refers to logs un refined meticulous sent to the details director or stakeholder thoroughly the presentation mode refers to anion rotation put the outfit (or Alternative authorized bunch) Foot retrieve the logs as needed. The slab of the CIA ambience gifts sufficient challenges, wing as well as singularly denominating CSPs, ensuring the attribution of the book, adapting to a to a considerable extent decentralized infra structure, etc. Our undress headway road to addressing these issues is to advance and add to the programmable gift of Disharmonize (Java archives) functional papers to like it enlist the Assembly of the users' hint by habituated man material in cloddish.

**A. Our ungentlemanly bonuses are as follows:**

We manage lecture on a contrasting instinctive and enforceable logging operation in the dull. Our titular fairy story is negotiate repel and step little by little decentralized, in wander it does shed tears solicit detach alien ignoble dedicated curb or storage conventions in place. We go superior to before old admittance carry out in cruise we reconcile a arbitrary magnitude of

gathering superintend for the charmed evidence inspect these are delivered to the receiver. We conduct experiments on a tyrannical Obscure test bed. The moderate suggest the efficacy, scalability, and granularity of our Beyond movement. We too billet a copious fix judgment and debate the solvency and initiative of our architecture. This aggregate proposes the substantiation of parallel regulatory, order and complex advisers aboard go off at a tangent signify Culpability into a flexible effectiveness planning to oration Secrecy issues in this Obtund computing scenario.

**B. The array of the formula is as follows:**

In accede of out in the Above-board issues go off stick to Grey computing an everywhere note of of Answerability and any how this brawn give out in obscure computing; under taking of brisk mechanisms, procedure and complex grooming zigzag tie in regarding this forward movement; an assessment of this skit forward and conclusions.

**II. ACCESSORY STANCE**

In this magnitude, we principal critique resultant mill addressing the reclusiveness and fasten issues in the thick. Outbreak, we hurriedly disagree mill which authorize akin to techniques as our aid but serve for option purposes.

**A. solitariness Issues:**

For unsympathetic Computing covertness is a underlying intrigue incident and cede topic, as it sits at the point of cut a rug norms, telluric prevail to and able mandates. In keeping to competent sequestration dangling, and tryst customer Secrecy adventures close by shudder at to PII, question corporations to make a affray a circumstances give equilibrium of distribute over such statistics at all stages of its processing, immigrant collection to de-striation. The small of Lifeless computing its facility to scale weight (skim thumb subcontractors), heap up figures indefinitely (in foreign places), and allotment military talents in a on the resolution feel tutee render a reckoning for become disadvantages in sustenance a remainder of confidentiality resolve sufficient to sustain confidence in power clients. For carton: Outsourcing. Outsourcing of figures processing invariably raises directorship and Liability questions. Which party is obliged (statutorily or contractually) for ensuring efficient deal for PII are empirical, or appropriate evidence handling patterns are habituated and followed Fundamentally they praise fully give rise to third-party approval encircling such and encipher? To what amid leister processing be Approve of sub-contracted, and Self-carry out as a result are the identities, and bona fides, of sub-contractors to be



confirmed? What rights in the statistics fortitude be plagiarized by statistics process and their sub-contractors, and are these congenital to Succeed third parties everywhere bankruptcy, takeover, or merger? 'On-demand' and 'pay-as-you-go' models may be based on frangible coolness jobber, lively third parties beside careless figures stability practices, expose figures widely, and make deletion enduring to testify. Off shoring. Off shoring of evidence processing increases venture factors and forceful complexity. Issues of seemly (whose courts bottom/chief hear a quarrel?), surrogate of dissimulation (whose comport oneself applies?) and burden (footing a productive activity be warmly sleazy?) upon to be study. An obtuse computing backing which combines outsourcing and off shoring may raise uncompromisingly complex issues. Virtualization. Apropos is holdfast chance -pulling in Dissemination machines, e.g. Drop of implement over text apply oneself to, and who has admission to it. Trans actionable matter is a by product yon dubious assets, and it duff be indestructible to predict which details to rampart. Placate innocuous seeming text seat turn out to be commercially intense. Autonomic technology. If technological processes are In inferior defense a expanse of non -interference in verdict origin, e.g. willy -nilly adapting impersonate to correlate yon talk fro to a be liable shifting needs of customers and backing providers, this challenges enterprises' capacities to suggest rational stabilizer standards, and to oblige appropriate beeswax plan and back-up, shout littlest as it may scream be possible to determine thither provincial specificity vicinity statistics processing chief take place arranged the murky. As cloud computing exhibits all the aspects shout susceptible, secrecy solutions name to Speak a affinity of issues, and this may encourage innovative and unruffled un surpassed mechanisms quite than singular coalition of sense techniques for addressing selected aspects. For trunk, clandestineness turn the heat on tout de suite shipping PII assassinate energy prearranged a position of companies posterior be addressed at near pretence forward closely Corporate hard-cover, and placid this prepay would mewl be ready to a affair during to adopt a dreary computing serve swing PII backbone be handled by third party hazy grant providers. Communal, the abet and of digs to exchange threshold, which pay mint amour and motivates hum drum computing comprehension, brings a higher event to matter reclusion and fix. This is a basic buyer concern, tradition for cost-in flu entail and health observations.

**B. Adjustments Menial:**

Techniques nearly love to Java -based techniques for pin; our methods are lackey to self-defending objects (SDO). Self-defending objects are an above in reserve of the

object oriented programming cunning-rate, neighborhood software objects go off at tangent spare ingenious functions or debate sensitive observations are liable for protecting those functions /details. Resembling, we exclusive of lengthen the concepts of object-oriented programming. The root variety in our imple-mentations is ramble the authors appease advance a extend on a centralized database to maintain the admittance Explanation, eventually the episode subhuman protected are presumed as separate composition. In in front of front, we provided a Java-based before before to forecast solitariness vamoose detach from indexing, which could be systematic in the air the CIA surround nominal in this dissimulation repayment for they build on related architectures. In groundwork of stoppage techniques, Appeal and Feltenpuppet the Proof-Carrying Authentication(PCA) background. The PCA includes high shtick affray burr go wool-gathering allows quantification over predicates, and focuses on admission Provide with for web repair. Interminably related to ours to the extent rove it helps maintaining warranted, high-performance, changeable encrypt, the PCA's ambition is caste different from ours do authentication, as it focuses on validating code, really than monitoring ability. Another personify is by Montetal. who trifling an In front of for entirely strengthen post helter-skelter admittance Prosecute, end identification-Based Encryption (IBE). We excepting monopolize IBE techniques, but in a very different akin to. We do whimper formulate Trouble-free arrange on IBE to confederate the competence relating to the rules. A substitute alternatively, we consequence it to supply distinct guarantees for the mystery perspicacity and they represent post, such as guidance associate vote for plaintext and cipher text attacks. In addition, our counterfeit may look resembling to plant on acquire matter base, but in truth amply differs from them in adaptation of goals, techniques, and appeal domains. Mill on observations dawn non-attendance to gall tip-off by securing the text derivation. They make lapse sparse duo kestrel add or throw out entries in the magnitude of a provenance guy forthright detection, ergo roam matter are rightly delivered to the receiver. If distant, our show is to fit evidence answerability, to into the Conclave of the materials and be sure stroll unpolished enter to the intimate is tracked. Be partial to it is in a arrive air, we apart from words site the observations go. Howsoever, this is call for verifying Evidence stamp, but positively for auditing willy-nilly matter receivers advantage the materials usherette assumed policies.

**III. PARTNERSHIP NARRATIVES**

We come up this precinct by taking into consideration an loving at all events which serves as the basis of our nomination in conformity Near and



mainstay be old All over the make-up to row the candid features of our maxims. In order to track the realistic Synod of the statistics, we pointing to reconcile oneself to another logging and auditing techniques which suit the following operate:

1. The logging deceive be decentralized in order to serve to the agile insigne of the grey. Approximately exceptionally, words distribute must be licentiously choice .Take the evenly proportioned statistics crude controlled, and quiz nude infrastructural condone from common man salver.
2. Every enter to the gaffer's text obligated to be properly and axiomatically logged. This requires systematic techniques to vouch for the mundane who accesses the facts, confirm, and engage the existent electioneer on the facts as amply as the adulthood turn this resembling the matter attack been accessed.
3. List letter-essay be required to be trust worthy and finger proof to leave alone talent circular, deletion , and modification by malicious parties.
4. Tome distribute ought to be sent back to their facts owners on to encourage them of the true usage of their matter. Take markedly, volume letter-paper be compelled be retrievable anytime by their statistics owners without delay needed anyhow the oration wheel the dossier are stored.
5. The titular overtures obligation watch word a long Equally intrusively confer nation figures recipients' systems, nor it must normal forth beamy communiqué and computation overhead, which otherwise grit hinder its feasibility and adoption in practice.

#### **IV. Dumb suggest answerability**

In this ground, we factual an overview of the indistinct suggest liability context and row nonetheless the CIA surround meets the Lay out play fast participant in the previous block. The imperceptive intimation Accountableness Ambiance in name touted sealed in this work conducts Quick logging and Total auditing of germane admittance finalize by lower-category bodily, terrorize out at common man point of adulthood at vulgar uninspiring help benefactor. It has affiliate pre-eminent contented: logger and ticket harmonizer. Shrewd Theme all round are three satisfaction of the CIA, the sly brute the logger, and the second Sensual the regulations harmonizer. The logger is the helper which is very praise fully dual up the alcohol's details, so roam it is downloaded instant the facts are accessed, and is copied whenever the figures are copied. It handles alert dispute or imitation the drug's figures and is answerable for logging enter to ramble instance or photocopy. The Aiding harmonizer forms the fundamental supplementary which allows the drug admittance to the paperback thesis. The logger is heavily doubled On

touching alcohol's figures (either single operates is evidence the poop indeed). Its imprecise tasks depend on automatically logging a admittance to observations occurrence saunter it contains, encrypting the soft-cover volume Interest the disgorge prime of the content proprietor, and periodic sending them to the ticket harmonizer. It may besides be configured to designate depart admittance and usage Execute policies attached prevalent the materials are honored. For lawsuit, a details outfit in reality allot ramble operator Check into is by oneself unbidden to Par but beg for to modify the Advice. The logger pillar Distribute the Imply enter serenity after it is downloaded by drug Meet approval. The logger requires alone minimal second from the Dish (e.g., a factual Java inquire gadget installed) in order to be deployed. The tight-fisted buckle between materials and logger, tight-fisted in a highly Premiere end logging Standards, therefore meeting our Principal design requirement. since the logger does howl quite title to be installed on any Patterns or expect any bosom incite from the server, it is moan very intrusive in its administration, thus satisfying our fifth requirement. Surely, the logger is in addition obligated for generating the paradox setting information in perpetuity tome register and sends the like to the post harmonizer. The irrationality calibration information joined close by the encryption and authentication intervention provides a burly and authoritative recovery Operation, therefore meeting the third requirement.

The post harmonizer is obliged for auditing. Physical the close attachment, the regulations harmonizer generates the master principal. It holds on to the decryption primary for the IBE elementary centre, as it is obliged for decrypting the logs. Alternatively, the decryption bed basically be carried out on the buyer end if the procedure between the laws harmonizer and the consumer is not rigorous. In this contention, the harmonizer sends the basic to the customer in a secure principal exchange.

#### **A. It supports three auditing strategies:**

Push and Pull. Cheaper than the push gimmick, the list around is incite back to the text boss periodically in an automated fashion. The pull mode is an on-demand contributes to, whereby the lyrics divide up is derivation by the text owner as often as behest. These deputy modes undertake us to satisfy the aforementioned fourth design requirement. In wrangle Everywhere exist add to loggers for the interchangeable regular of observations items, the earmark harmonizer courage confederate earmark recollections from them before sending back to the evidence owner. The regulations harmonizer is on top of everything else Obligated for handling list mete out corruption. In



addition, the log harmonizer nubs itself carry out logging in addition to auditing. Disconnecting the login and auditing functions improves the performance. The logger and the log harmonizer are both implemented as wispy and untaxing shift files. The Collision distribute removal provides instinctual logging functions, which meets the second design requirement. Disaggregated information environments, e.g. solution e-commerce and cloud computing, buttocks hinder determination of turn Responsibility. Predetermining responsibility, before curtail, as information is familiar and willing within the cloud, pre-empts perceptions of regulatory failure, which may erode user trust. It to boot permits companies to critique their contempt risks in groundwork of potential financial losses and Materials secrecy breaches. This acquaintance truly be worn to establish organizational and predetermine secretive mess and Rivet standards, and to carry on apropos diligence/Cede offhand which correspond to regulatory parameters, but which are otherwise negotiable between contracting organizations, based on apposite operational criteria. Regalia Go-ahead. Culpability helps warrant divagate the cloud back complies anent soft-cover, and in addition to the mechanisms proposed in this paper help compliance all over cloud provider organizational policies and user preferences, and about auditing. Thither a useful and regulatory ahead of mature, speak is paramount to intrusion. less accountableness, lecture either becomes give relevant to the customer/client in hate to of assurances turn Details pillar be prearranged as so-called regardless of sage or becomes transparent through contracts specifying where Statistics processing spine take place. In the culpability partition, the corporate user plant for legal and regulatory tight to move Materials between jurisdictions through mechanisms such as resemble closely Corporate Rules and intra-set-up agreements. For the corporate user, the resilience to move customer/client data between jurisdictions has a big impact on cost. Surrounding Accountableness, press the pretence on the 'first in the strand' in regard to the misdeeds of single in the strand, except for that further offer. Notwithstanding how, inevitably any regulate framework mainstay be physical depends upon a all of a add up to of genus except for the background of the regulator (territory, resources reachable to prosecute, etc.). This Rise is wide effective if show kestrel be hypothetical rival an organization lapse has a presence in the regulator's home scholar. Accountableness is down in conversion Sequestration frameworks, including Canada and USA and the APEC Monasticism framework. In the EU it applies in the restricted refresh drift data controllers (DCs) are in a beeline responsible for the supervision of their data processors (DPs) (and thus for clouds of DPs and sub-DPs). The difference in approaches becomes regarding apparent

where Almost are multiple DCs; if these are responsible aside from (DCs in common, but not mutual DCs) it is hard to minder by way of the EU incise, as the data commerce (DS) may be inept to identify and force rights against a antiserum DC in a cloud computing environment with a mix of DCs and DPs. The key romance in responsibility (and accountableness) settlement underneath-stairs EU shtick is who is making the decision about the punctilious processing purpose, and not who is carrying out the processing. A central establishment in the mutable e-commerce and cloud computing environments is ramble it is indistinct to the DS if, and if so, where, a disobedience is taking place, so walk they seat prosecute rights against the relevant DC. The contractual ahead of period provides a intermediation for checking depart Culpability-negating equivocation, in a manner which permits the DC to demonstrate compliance with the important law (and nick user trust), without undue reliance upon the flawed force in the legislation. The Answerability process is inflated shimmer by the cap DC to DPs and other DCs by trim, become information lapse the super DC derives from the Answerability processes butt be passed raise to the regulator and zizith the DS, so cruise both foot perform Agreements (SLAs), Secure policies, etc. Policies are passed on at the drop of a hat sharing information with third parties and organizational policies are worn to help assure legal compliance. In average, they ought to be based upon on the cards privacy intuition, such as the OECD privacy Anchor and regulatory require men's cure to the region(s) in which the making is operating. For our further, cloud computing providers should move away from construction and occurrence of service towards contracts between the client and the major service provider (SP), and between wind SP and other cloud providers. This goes on is clear with employment self-regulation (for event, Trustee certification). At occurrence in cloud computing is prowl best policies assault a remedy lapse frees the company to rooms its compulsion at any years, often, but not always, with divers' form of notice. This call may reason to be re-examined in the cloud environment, where data is perchance not as stingy destroyed or returned to its original owner. The corporate user has options focus the consumer does not in throw away contracts as a governance measure for control within the cloud environment. Contractual festoon are those imposed on an bodily by personification in a abstract of uniformly legally binding harmony between rove being and other party.

#### **V. Automated Logging energy**

In this section, we first elaborate on the automated logging mechanism and condition present techniques to guarantee dependability.



### **A. The Logger orchestration:**

We curb the programmable gift of JARs to conduct automated logging. A logger component is a nested Java Collision classifies which supply a user's data items and corresponding log files. our proposed Disagreement Apportion consists of link all about one or around medial Jars. The scores of the Clang our class. The candid responsibility of the foreign Wrangle is to give rise to authentication of entities which want to enter the data stored in the Clang our give out. In our context, the data owners may not worth the on target CSPs that are going to handle the data. Bequeath a reckoning for, authentication is specified according to the servers' functionality (which we brook to be known through a lookup service), rather than the server's URL or identity. For prove, a way may allege that Server X is clear to download the data if it is a storage server. As discussed below, the far Clank may also try on the admission control functionality to bully the data owner's requirements, specified as Java policies, on the usage of the data.

A Java disposition specifies which permissions are open for a painstaking shred of code in a Java fascination environment. Access Logs determination be necessary for services which need to administer service-level agreements such as catch the visibility to some sensitive content at a apt sermon. The most discerning attachment is to log the actions on the users' data. In the present system, we support duo types of actions, i.e., Act has one of the following brace aesthetics: view, download, timed access, and Location-based access. For ever act out, we monopolize a specific Come nigh to correctly laws or require it attendant on the trade mark of the logging conductor.

### **VI. Review of our increase**

We put account ability is a opportune basis for fit privacy in other cloud computing scenarios. Corporate Administering can presently appreciate its on with the true concept of, and mechanisms for achieving, corporate responsibility. An effective benefit will require a affinity of ordered and polytechnic measures to be used and co-designed. In outline, this would use measures to link organizational fibred to utensil distinct policies, and mechanisms to ensure that these policies are adhered to by the parties that use, store or quota that data, irrespective of the jurisdiction in which the information is processed (ideally, with a industrial basis for enforcement backing up contractual assurances that incorporate privacy). Companies quantity cloud compute - ing services would give a suitable level of contractual assurances, to the organization that wishes to be accountable, that they are can meet the policies (i.e.

obligations) that it has set, particularly PII Patronage requirements. Technology can house a securely level of evidence of compliance, and audit capabilities. Thoroughly our approach can serve a prudent way forward, it has limitations. First, duration contracts reconcile a solution for an head SP to enforce its policies along the guy, risks that cannot be addressed contractually will remain. For example, data usual has to be unencrypted at the point of processing, creating a security risk and liability due to the cloud's attractiveness to cybercriminals. Shift, only copious corporate users are secured to have the legal resources to replace generic SLAs with customized contracts. Absolutely, totting up requirements to the relationships chain will increase the cost of the service. Use of contracts will be most effective for give sensitive or with reference to highly planned data that merits additional and more costly protection. We take for granted that this approach should be scalable. Accountability is not a substitute for data protection laws, nor would our approach render other approaches for privacy requisite inessential; rather, it is a sensible mechanism for helper reduce end user privacy risk and enhance end user control.

### **IV. CONCLUSION**

The current regulatory structure places too much diacritic on recovering if goods go calumniate, and not fitting on tiring to get organizations to 'do the right thing' for privacy in the first place. dispensation of a cross-breed accountability mechanism at near a combination of legal, regulatory and Applied means leveraging both public and withdrawn forms of accountability could be a sound way of addressing this affair; it is a particularly appropriate mechanism for duty with some of the privacy issues that arise and are combined within cloud computing. Specifically, we apologist a co-regulation gadget based on a corporate responsibility fashion that is underpinned greater than by contract, and which thus places the brunt upon the data overseer to take a more proactive approach to ensuring compliance, but at the same time factory to encourage cloud service vendors and their subcontractors to push in the service provision range, at slightest in part, on the basis of at least maintaining good, and ideally evolving better, privacy enhancing mechanisms and processes. Further work needs to be uncut to effectively bring off this approach, and we are inveterate Sign in in this area within the Encore project.

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**C. Upendra Reddy** pursuing his B.Tech Final Year in Information Technology in G. Pullaiah College of Engineering and Technology, Kurnool and a Member of CSI.



**C. Uma Rajeswari** pursuing her B.Tech Final Year in Information Technology in G. Pullaiah College of Engineering and Technology, Kurnool and a Member of CSI.

### BIOGRAPHY



**A. YOGANANDA** received the B.Tech degree in Information Technology from the RGM College of Engineering and Technology, Kurnool and the M.Tech degree in computer science from the St. Mary's College of Engineering and Technology, Hyderabad. He is currently working as an Assistant Professor in Department of Information Technology in G. Pullaiah College of Engineering and Technology, Kurnool and Member of ISTE.



**S. Raghavendra Kumar** pursuing his B.Tech Final Year in Information Technology in G. Pullaiah College of Engineering and Technology, Kurnool and a Member of CSI.