|  |  |
| --- | --- |
| Team Name | PreFlowd |
| Proposed Title  [ Max 15 words] | Prediction and Prevention of Flood through pre-Flood water diversion to water-crisis areas |
| Innovation statement  [ 20 words] | Ghatal subdivision in West Medinipur district under West Bengal is considered to be the most vulnerable place to tremendous flooding. The frequency and magnitude of floods in Ghatal subdivision has increased considerably with the changing time and the effects get worse on the lives of people residing there. Targeting to contribute to disaster management, the objective of this project is to develop a flood prediction and flow diversification algorithm which will help us to divert the pre flood water before entering into Ghatal. |
| Abstract  [Max 150 words] | Strategic water diversion for different solutions at diverse timescales and points could be made available |
| Policy highlights  (Max 2)  [Max 75 words] | Development of river-interlinks and canals for water diversion for implementing different solutions at diverse timescales and points could be a suggested solution.  Final decisions of whether to execute a specific diversion and simulating deeper effects of such diversions could be leveraged using further evolved versions of such proposed mitigation algorithm after integrating it with realtime good quality datastreams with accurate prediction algorithms |
| Objectives  (Max 2)  [Max 50 words] | Flood prevention  Flow diversification |
| Input data | Precipitation  Soil infiltration data  Discharge data  Temperature  DEM |
| Model description  [Max 150 words] | Flood prediction algorithm would be used for locating flooded areas. Mitigation algorithm will use previous timestaped data at higher elevation points in the same watershed as sources for water diversion points. Simultaneously sinks would be identified at nearby locations at nearby timestamps. Sinks would comprise of other streams or areas with water crisis (or droughts). Further iterations would be done to validate that no damaging after effects arise due to the solution implementation. |
| Expected Tangible Output(s)  (Max 3)  [ 100 words] | Water route diversion points (source and sinks) and their timestamps. A predicted flood could have solutions at different locations and at different timestamps. |
| Validation strategy  [ 100 words] | Field Survey |
| What decision can be taken from the outputs?  [ 100 words] | Best mitigation strategy for a predicted flood could be identified. Initial possible solutions would include water diversion and further extension of the model could include complex solutions like using natural basins as reservoirs or cloud seeding beyond dense precipitation regions, etc. |
| Potential User(s)  (Max 3) | Government |
| Similar solution (s)  [provide a link if available] | [10.1109/CSDE53843.2021.9718497](https://doi.org/10.1109/CSDE53843.2021.9718497)  2..In this study , Accuracy of the three Machine Learning Algorithms i.e. Decision Tree, Random Forest and Gradient Boost were measured and the Decision Tree Algorithm gave the highest accuracy with mean absolute error of 0.05606 .Hence, this algorithm was chosen for the prediction of flood.This system able to send warning and alerts of an incoming flood and helps to save human life and infrastructure  (<https://dx.doi.org/10.2139/ssrn.3866524>) |
| Scope for Scalability and Reproducibility  [75 words] | Worldwide integration of an automated decision system for disaster mitigation could start by taking the first steps of developing similar mitigation algorithms for specific watersheds. |
| Major limitations of the solution  [75 words] | Resolution of available DEM |
| Contributors to prepare this concept note | All Team Members include:  Santanu Banerjee (MS Operations Research, IITKGP);  Papia Das (MSc GeoInformatics, Adamas University)  Ranajit Adhikari (Masters in GeoSpatial, Burdwan University)  Manisha Baral (Assistant Professor, Adamas University)  Kasturi Mukherjee (Associate Professor, Adamas University) |