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Theme: Smart Agriculture and Rural Development
Problem statement: PSAR003

Problem Statement:

Smart apps that could give insights on climate changes and helps in monitoring yield minimizing losses to the maximum extent possible

Proposed solution:

Introduction:

Agriculture is one of the oldest jobs in the world that predate civilization. India has a lush history with agriculture that dates back to the Indus Valley civilization era and further before that in more southern parts of india. Agriculture contributes to 60% of the indian populace and contributes 18% to India's GDP. It has been predicted that the future climate will not be favourable for the lower latitude countries which envelop south india. As we know cultivation is a heavily local climate dependent process with the produce varying depending on the crop. This is primarily because every plant has an optimum temperature for growth and seeding. A smart app that utilizes A.I. to advise the farmer on what crops to grow based on the statistical trends of local climate will be of prime use because climate is a complex phenomena to predict and could help farmers tremendously. We have proposed a solution which is one such smart android application that helps in predicting the best crops for the season that will yield maximum produce.

Idea and UI :

The team proposes using an android application interface that can be easily installed on the user's mobile phone using PlayStore. The android app will gain access to the GPS location of the device once the user opens it. The UI will be very simple with a button which when clicked shares the farmer's GPS location and a text box that requires an input soil type.

Working model and optimization:

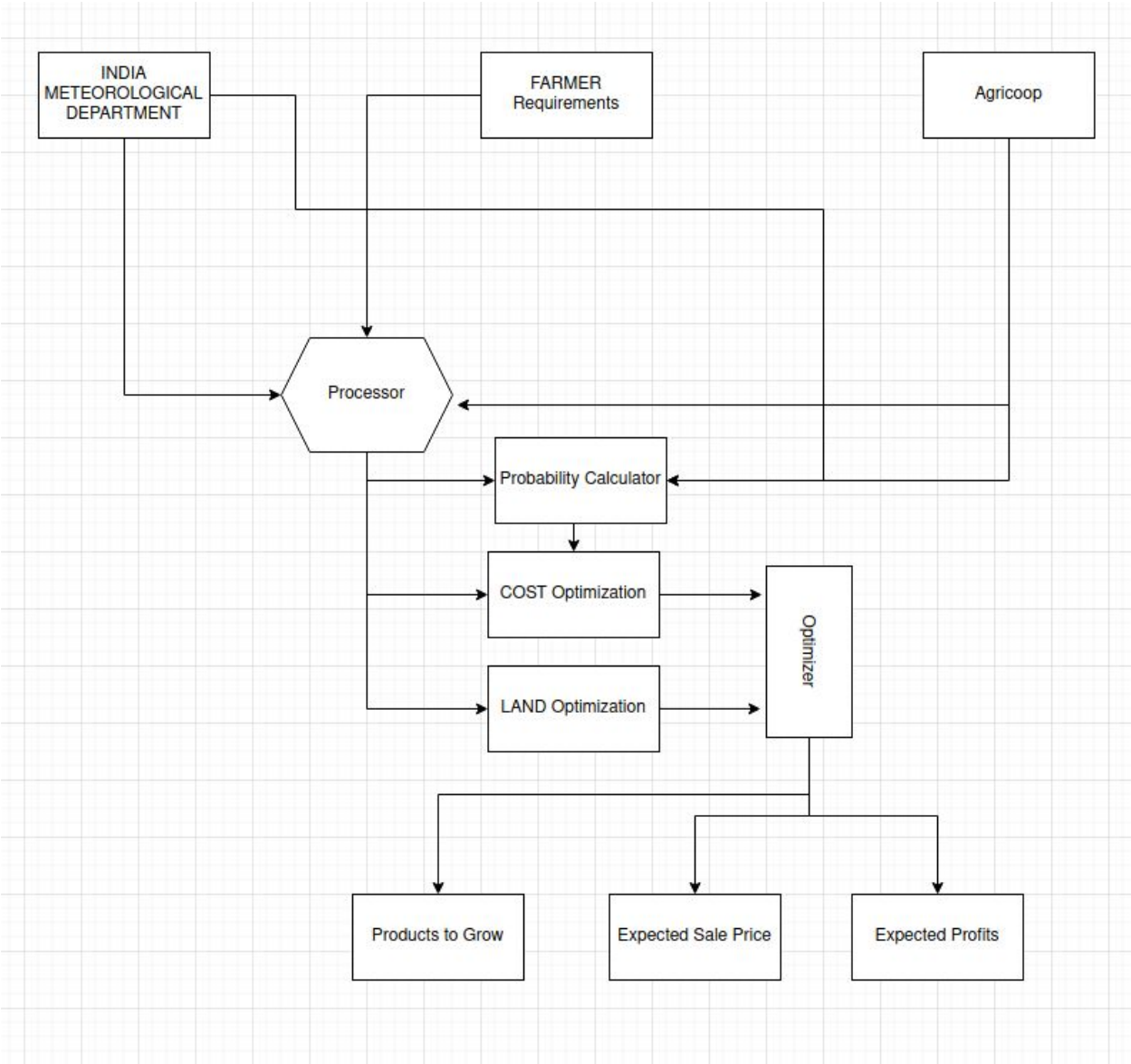
All climate estimates will be made with data from the meteorological department of India and the price estimate will be modelled as a simple linear regression problem and calculated. The algorithm for prediction will be designed such that it balances the trade off between crops that will endure better and crops that will sell more in that particular season. We take the six indian seasons into consideration and will have a list of crops that are grown prelevantly in that particular area and also subdivide them into sub categories based on temperature, water requirement and soil health. The farmer is also provided with an option to choose a safety point wherein he can safeguard his investment in both time and money.

Another important factor besides the climate would be the money invested by the farmer in his crops. Based on the above factors such as temperature, water requirement, soil health,

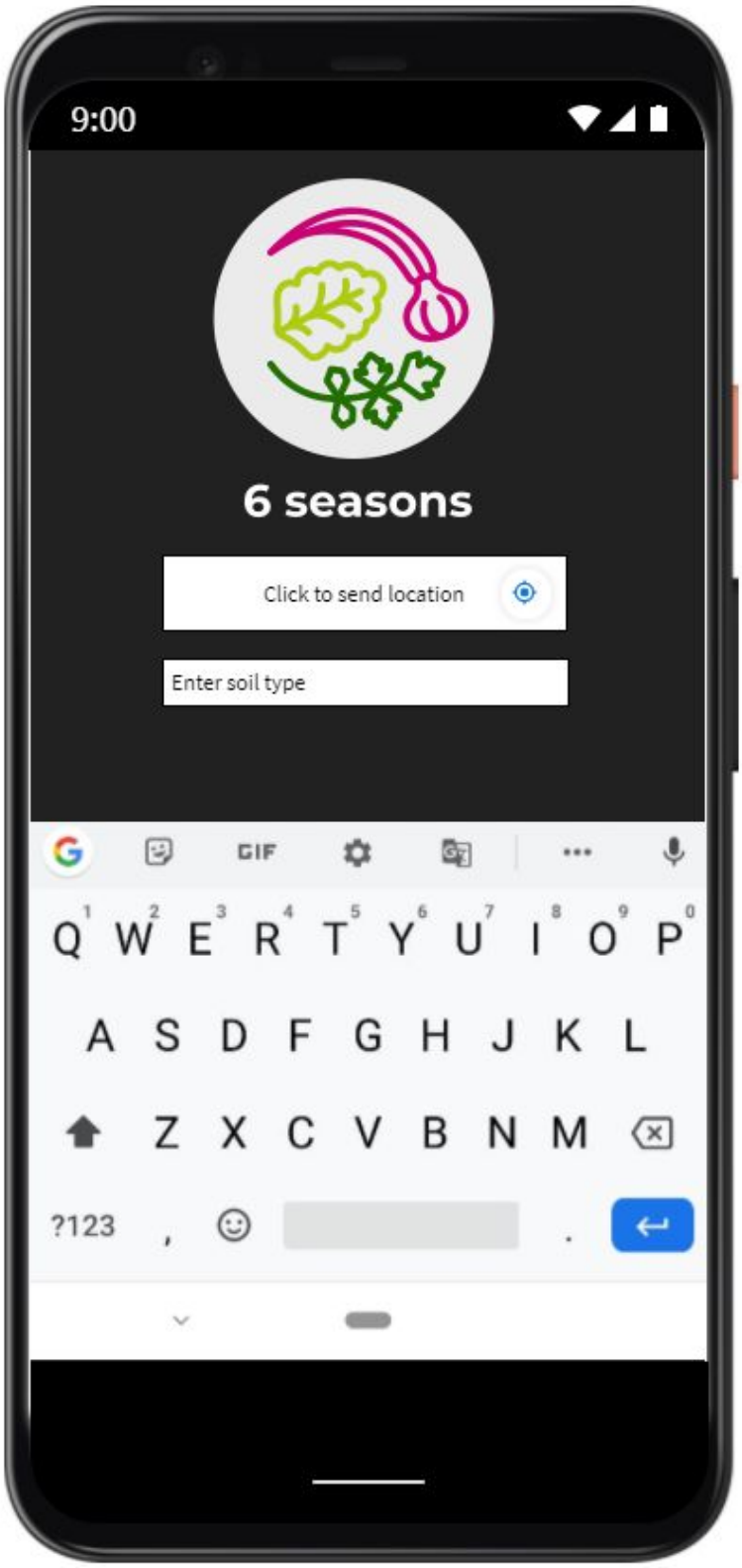
region etc the crops are chosen and n crops are assumed to be x1, x2....xn. The factors that need to be estimated are money and space. We assume the farmer has S square feet of land, then s1x1 + s2x2 + ... + snxn = S, and assuming selling prices to p1,p2,....,pn the function p1x1+p2x2+...+pnxn = P will be maximized. Also, certain crops will have higher sustainability in that particular season, and some may have low sustainability and to compensate for that, a modified selling price is taken to be Prob*p1, where Prob is the probability that the crop is produced. The probability function here compasses the effect of climate, possible pest attack, Soil nutrient values, chances of crop failure.

Software requirements:

Python, javascript, java, android studio, flutter, tensorflow, scikit-learn



Case diagram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Proposed UI