AR Farming Project – Augmented Sampling – Software Engineer masters project

This augmented sampling project is to explore if an Augmented Reality headset can help quickly direct a user to conduct soil samples across a fixed area. The project will first be developed on an Android smartphone using an integrated GPS and electric compass. If needed an Android based phone will be provided to the student for the length of the project. Then once that stage is complete, the project will be ported to a BT350 Augmented Reality headset which will be provided to the student. The AR headset is android based hence the porting should be made easier. The software stack used will be at the discretion of the student. This project is not allowed to be taken by a student who has professional android developer experience.

Software and Equipment:
Student will be given access to a BT350 AR headset as well as an Android phone if needed.
The project must be developed on Android but it's up to the student to decide which IDE to use.

Requirements for Project:
- Display the boundaries of the field, these will be invented fields at first
- Track the sampler using the GPS.
- The ability to show the sampler the management zone boundaries, the code of the management zone, the field number being currently sampled, and the next sampling point they should get to. Ideally the sampler will see only one point at a time, being able to see the next one only after sampling the current one
- Adapting and calculating the shortest path to be taken, based on the sampler's field entry point
- Getting the project to work in an AR headset.

Exceptional
- Integrate sample GIS data into the project so the fields generated are taken from real data instead of faked. The SeeCrop API from Origin (Industrial partner with UCD) will be provided to the student for GIS data but alterative open source GIS data sets can be used by the student.
- Integrated voice control commands – "Start", "Sample acquired" – as the samplers might get mud on their hands
- Calculating the position of the 24 points to ensure an optimum distribution in every management zone, in order to obtain an accurate representation of the sampled zone
- Field test proof with an experiment to demonstrate the app is capable of finding the shortest path and redirecting the user if required.
- User Study to explore how well the app functions, if the student wishes this could be done in conjunction with the industrial partner linked to the project.

Industrial Partner:
This work will be in conjunction with other research taking place within CONSUS , SFI funded research centre , CONSUS aim to modernize farming by combining machine learning, big data and advanced Augmented Reality visualizations. If the student is interested, the industrial partner (ORIGIN) can help conduct a user study of the system. This is optional as the student could conduct the user study independently of the industrial partner.

Please contact Dr. Abraham Campbell if you are interested in this project and have any further questions.

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