

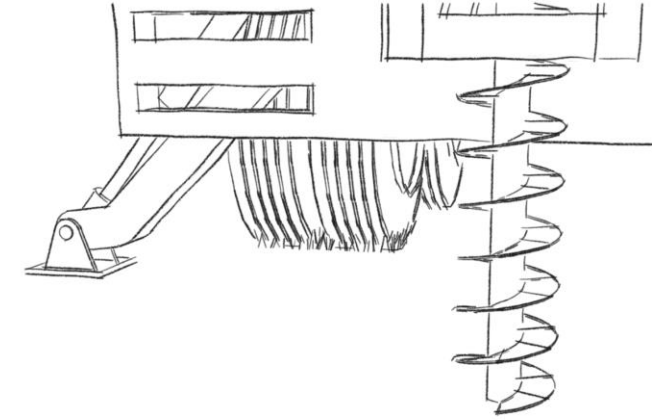


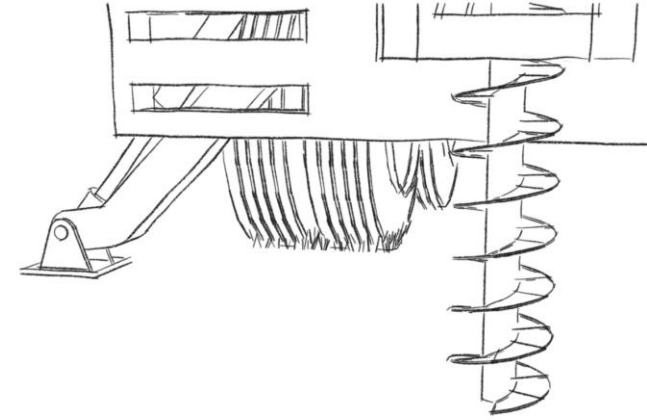
Review of Geosetta



1. What is Geosetta?

- Geosetta is a non-profit Maryland based company
- Geosetta is providing a platform for hosting subsurface/geotechnical data from various publicly funded sources throughout the United States.
- Geosetta is developing geospatial and augmented reality visualization tools, with machine learning techniques.
- Geosetta provides a preliminary understanding of the anticipated subsurface conditions at any project site. And is a tool to plan an efficient/focused subsurface exploration program.





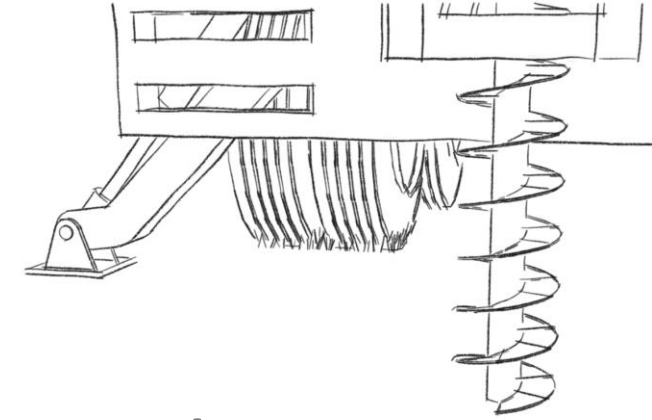
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2. Mission

Presenting and deriving valuable deliverables from publicly funded geotechnical data for the benefit of the geotechnical and civil engineering profession.





Data Sources



Standard Penetration Testing



Auger Testing



Foundation Installation



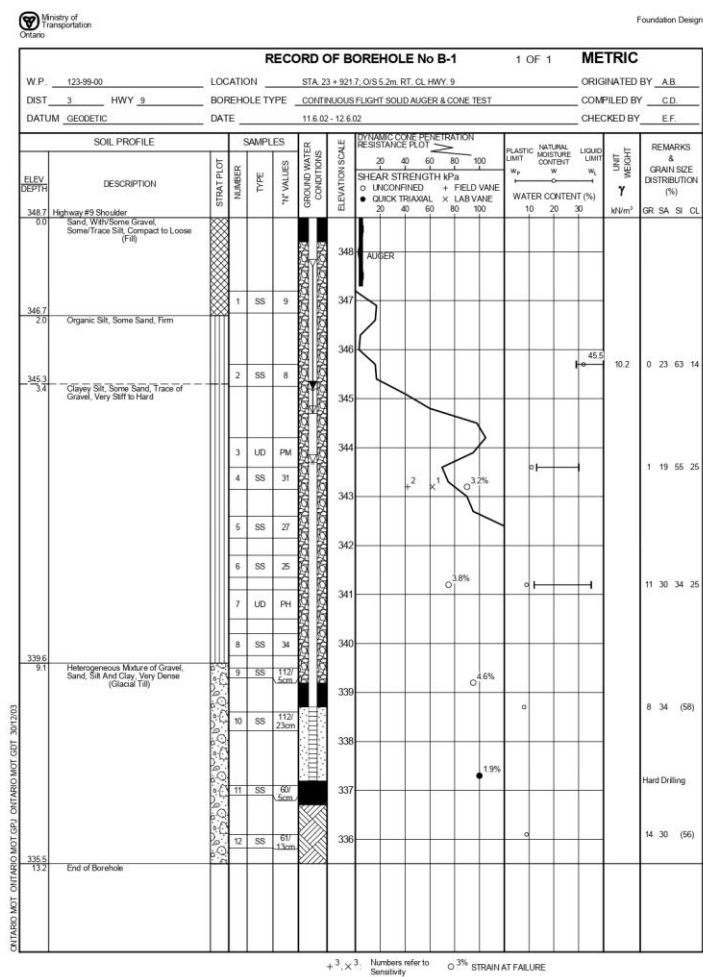
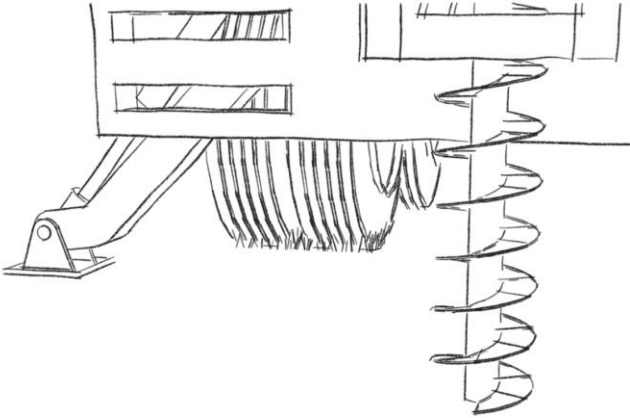
Data Examples

- Soil Strength
- Ground water Level
- Depth to Rock
- Soil Composition
- Rock Composition
- Rock Quality



Existing Data Formats

Government agencies spend millions of dollars performing geotechnical testing for their projects each year. The results of this testing is generally stored in paper logs, or single standalone electronic files.



These datasets are..

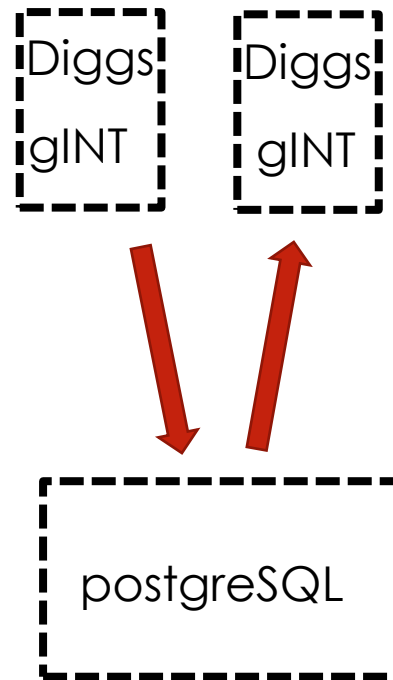
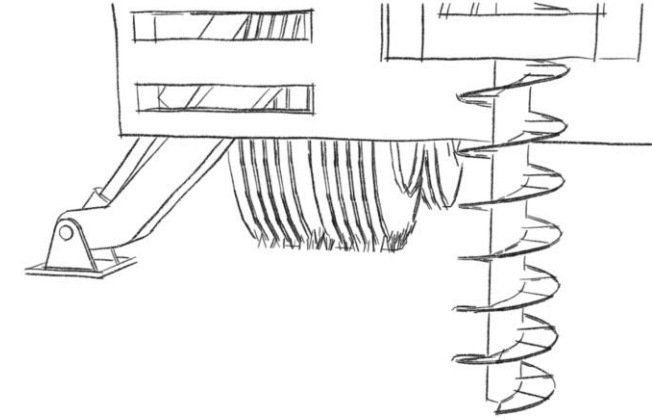
- not GIS enabled
- not easily extractable or searchable
- difficult to use and visualize



Geosetta

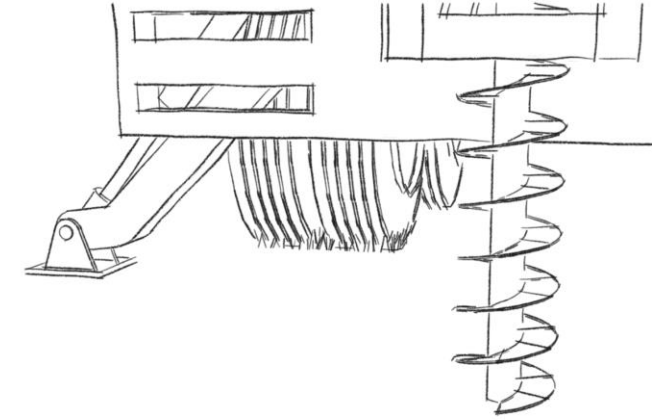
Geosetta's Foundation.

- Procedures to automatically extract gINT or diggs datasets into an postgresQL database and vise versa. (IE generate gINT or diggs files on demand from the database.)



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- Procedures to automatically extract gINT datasets into an oracle database and vice versa. (IE generate gINT files on demand from the database.)
- Built a Esri agol based tool for the requesting drilling, tracking testing, and displaying historic data.



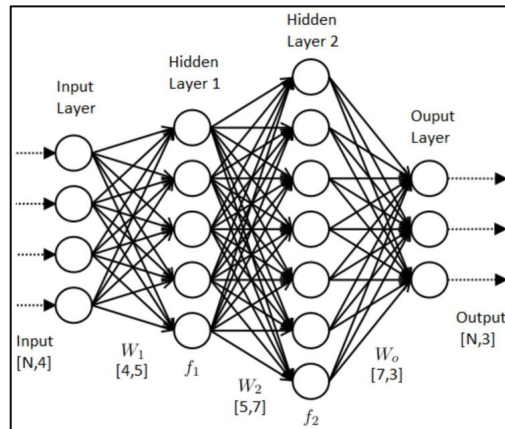
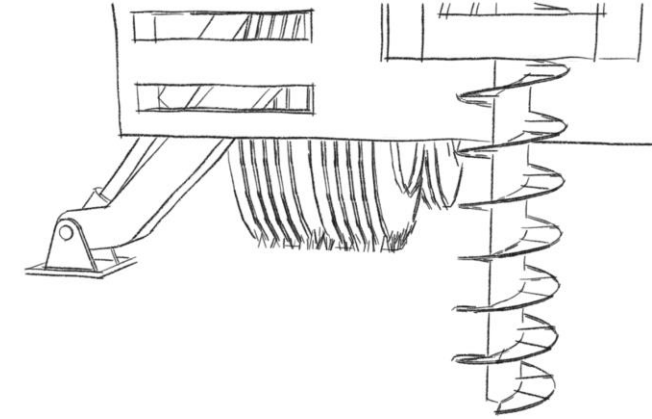
Requestor	Req. ID	Sub Date	Borings	Boring Type	Status
Justin Mohr	PG258A22(1)	2018-12-12	0/8	SB	Submitted
Sangjoon Han	GA2065229(1)	2018-12-12	0/2	EB	Submitted
Ervin Ugot	HA448A21(1)	2018-12-18	18/18	PB-SVM-FB	Submitted
Getaneh Wolde	WA092A21(5)	2018-12-12	0/5	EB	Submitted
Steven D'Rumr	BA060A22(6)	2018-11-30	0/6	BR	Submitted



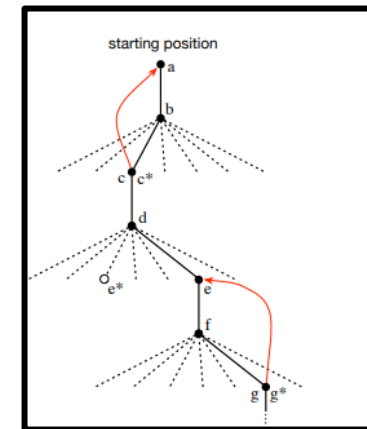
Geosetta

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- Procedures to automatically extract gINT datasets into an oracle database and vice versa. (IE generate gINT files on demand from the database.)
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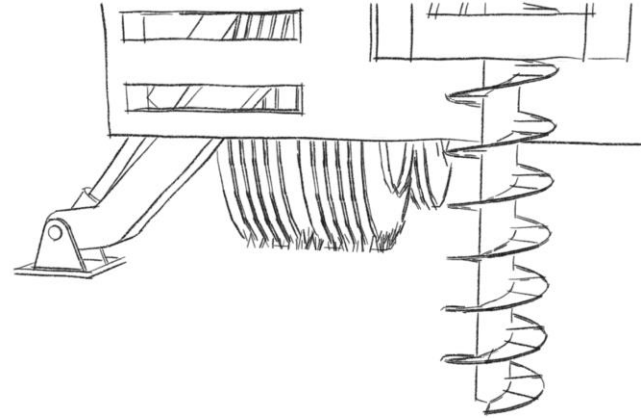


Supervised Learning



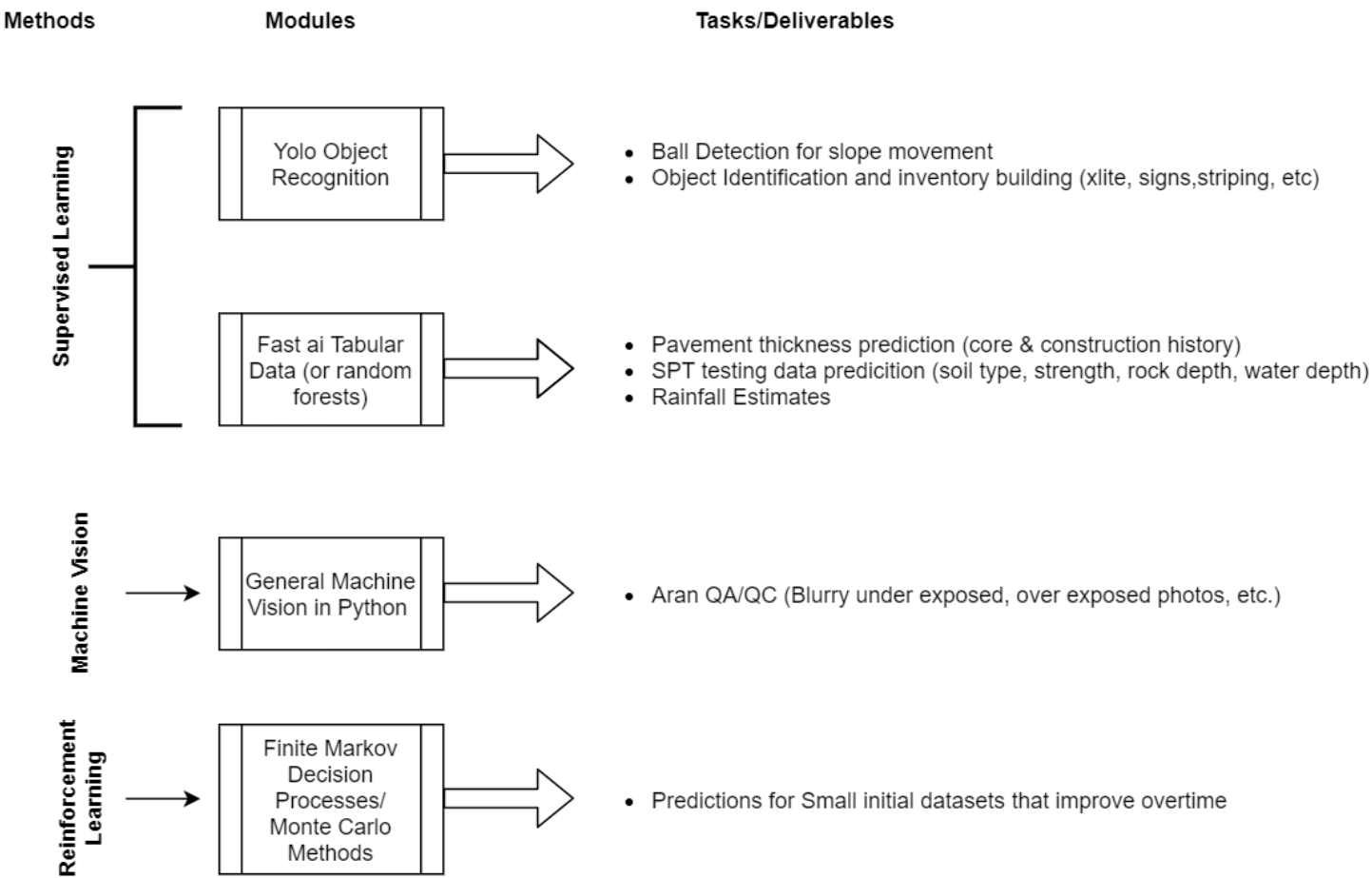
Reinforcement Learning

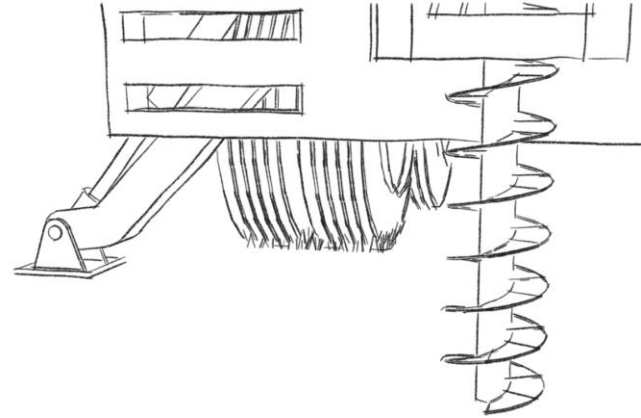




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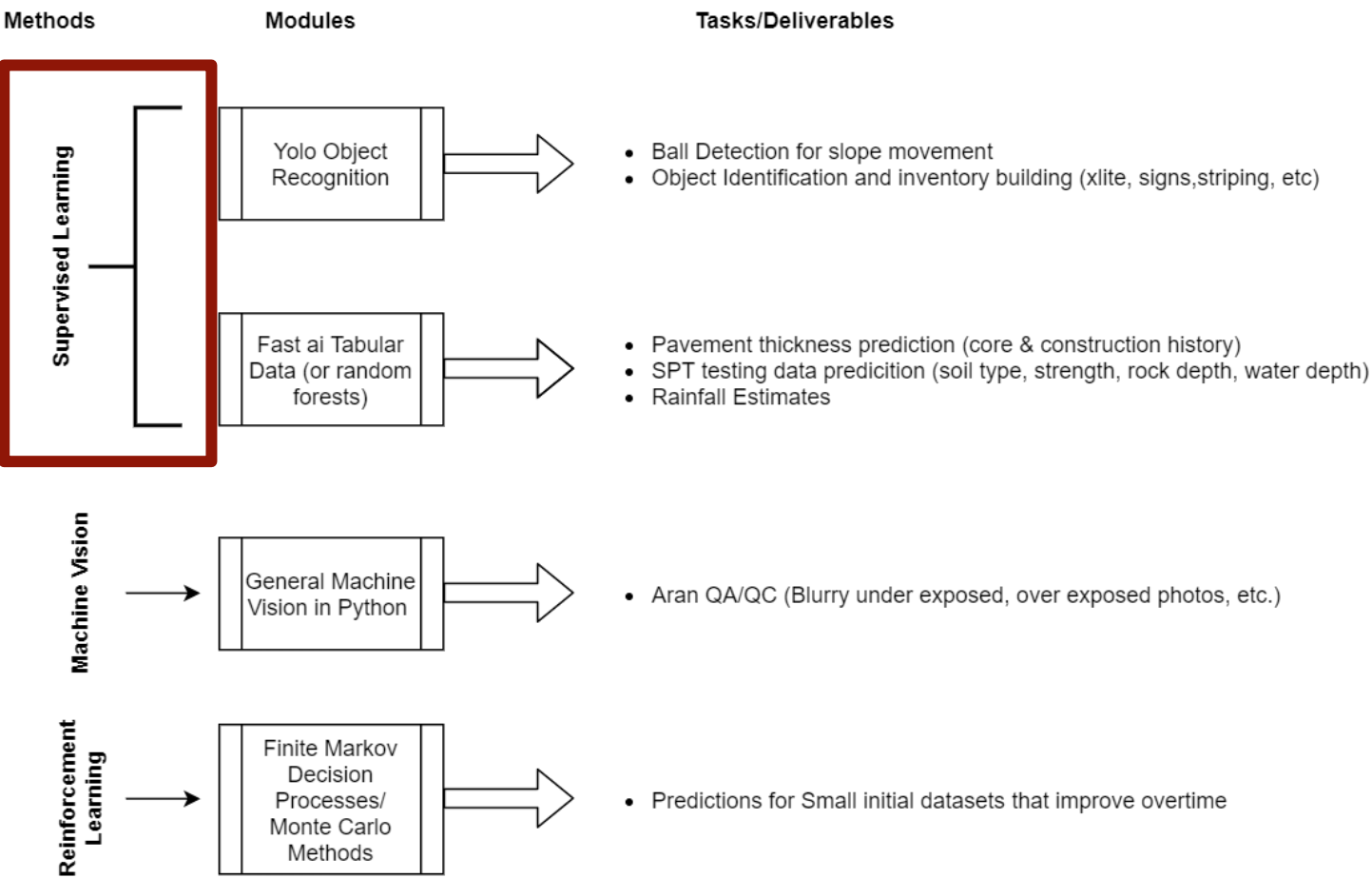
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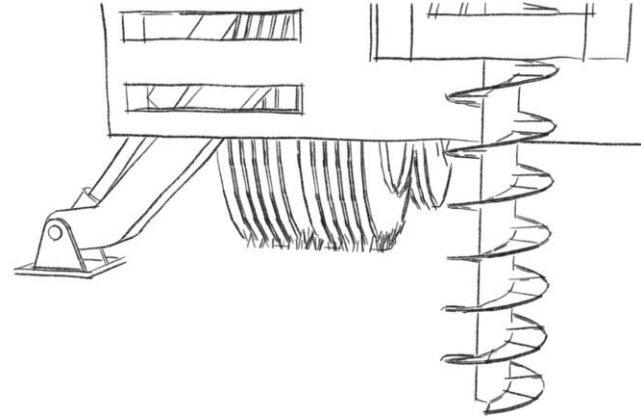




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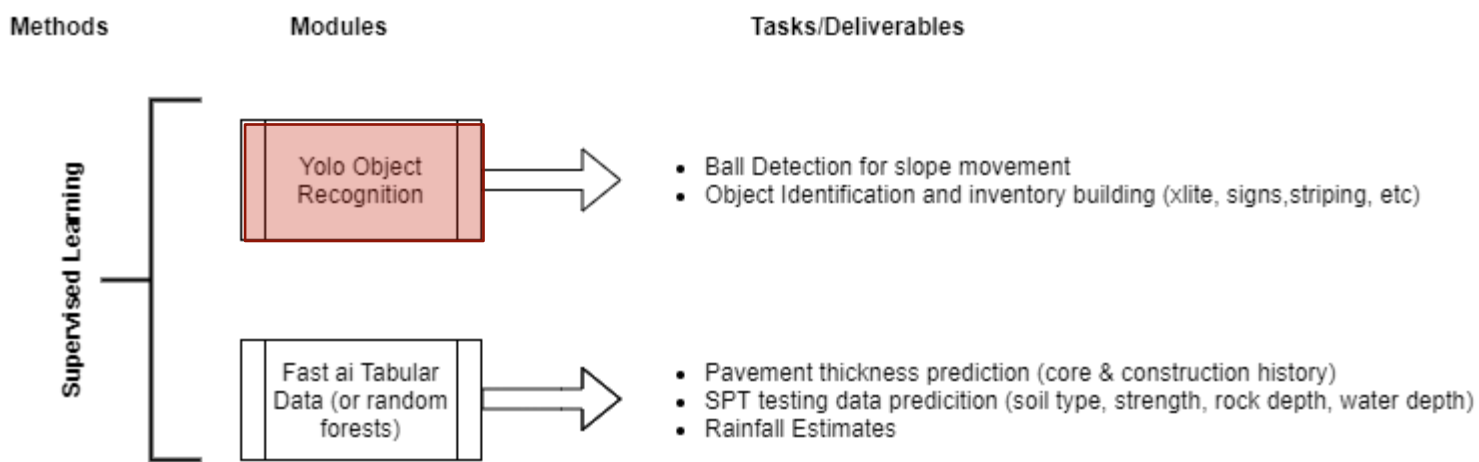
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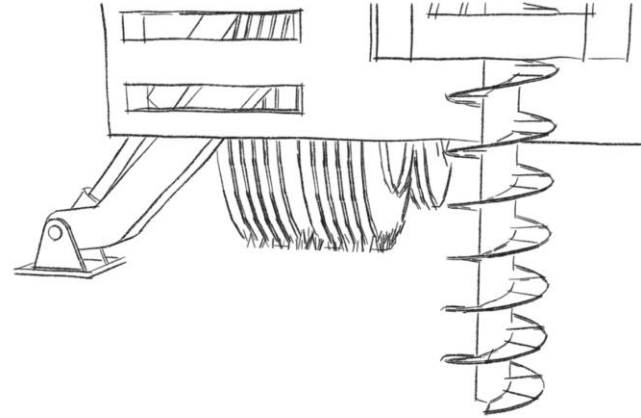
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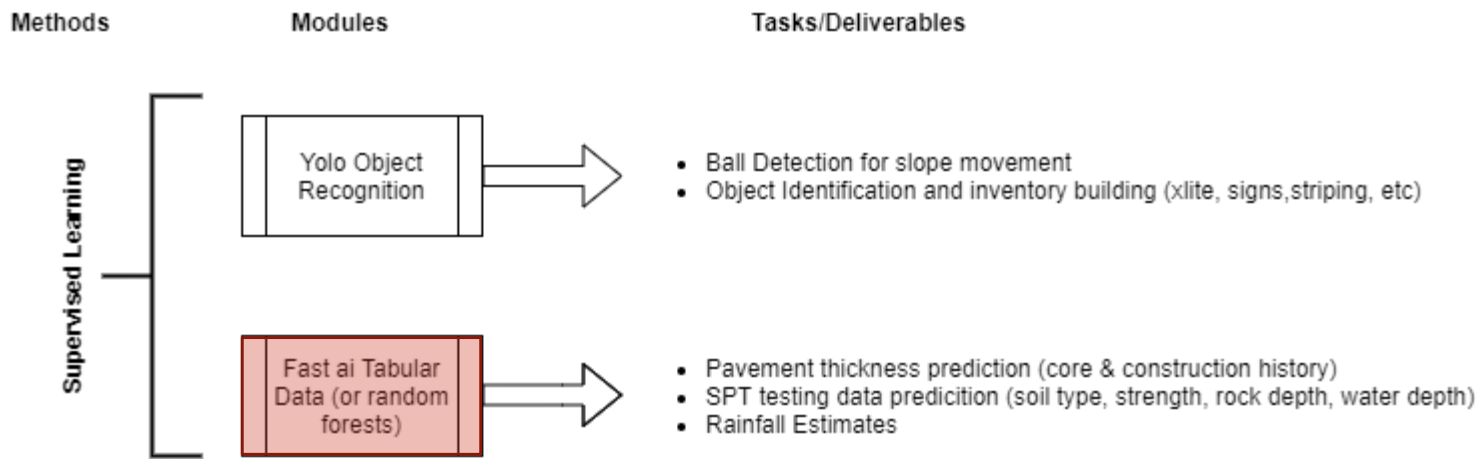
- Notes:**
- Works for photo and video
 - Find present or missing objects for building Inventories
 - Identify issues in real time from video



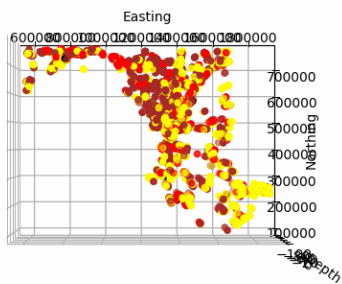


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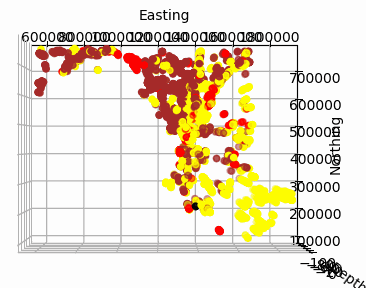
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Actual data

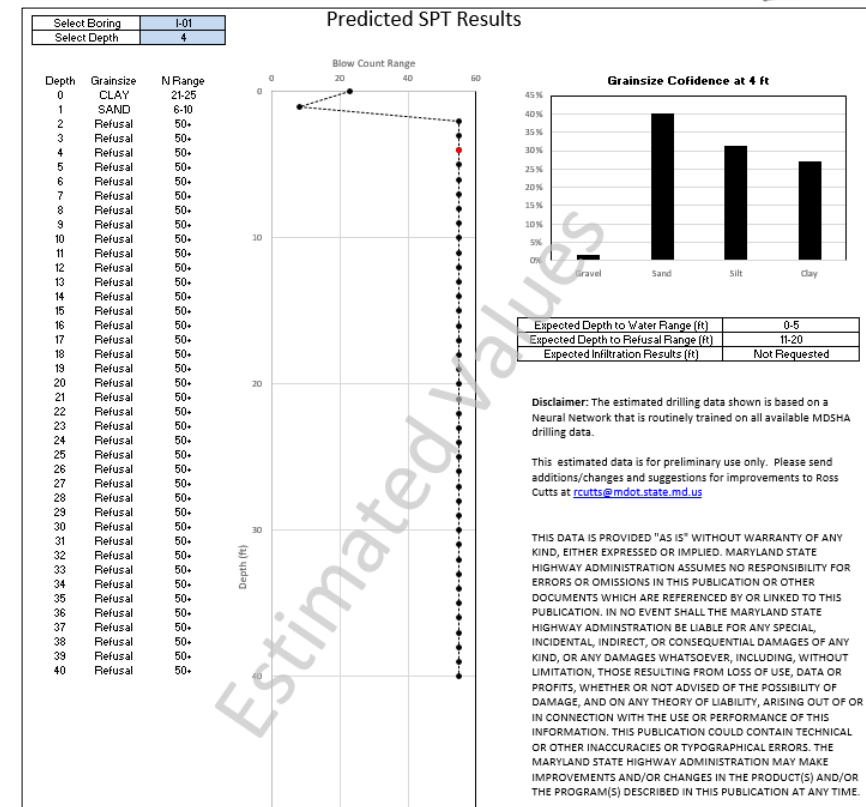


Model data



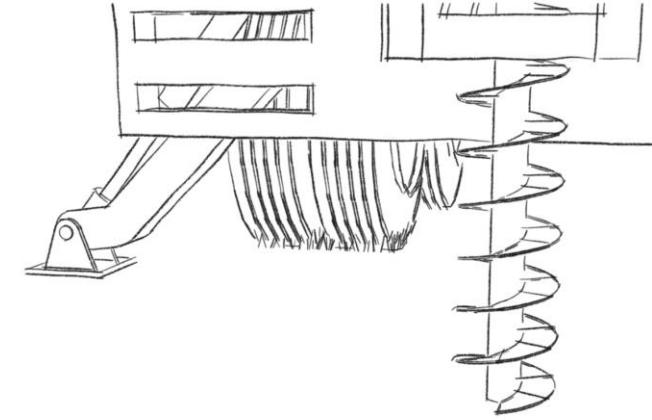
Grainsize

- Clay
- SAND
- SILT
- GRAVEL

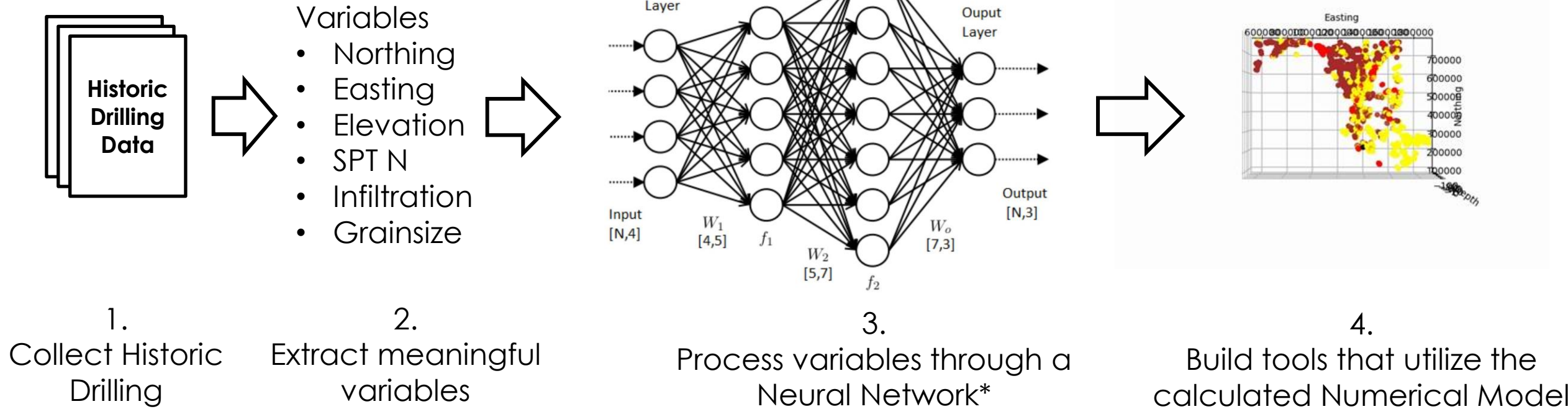


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Training Neural Networks



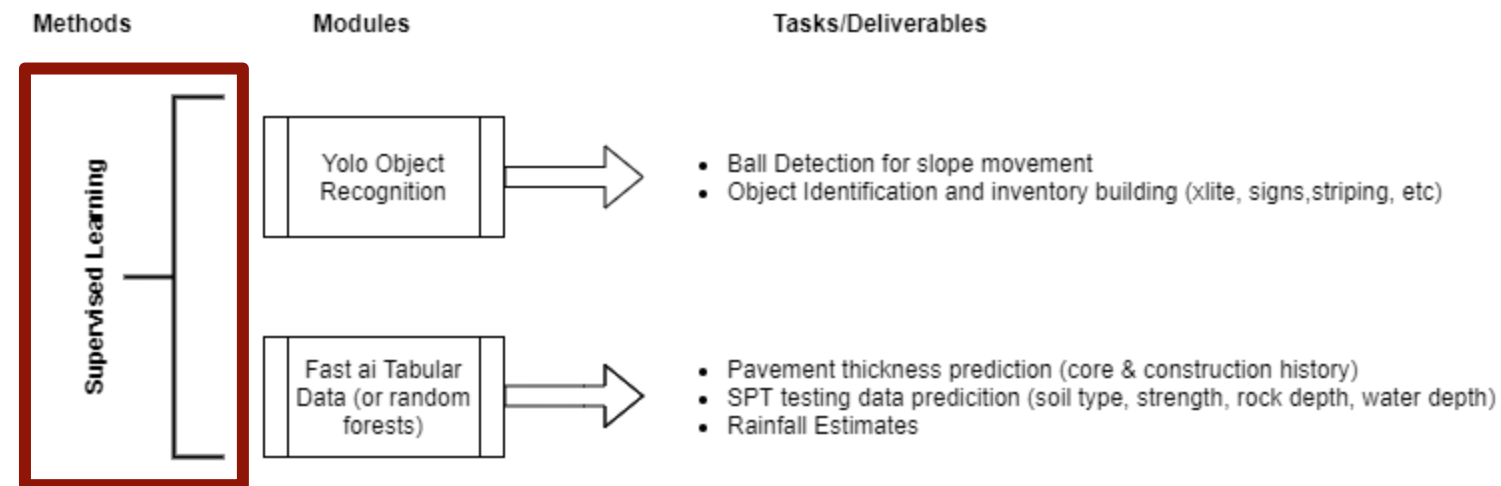
*Step 3 is a recursive process where the network geometry is optimized/derived for the dataset.



Geosetta

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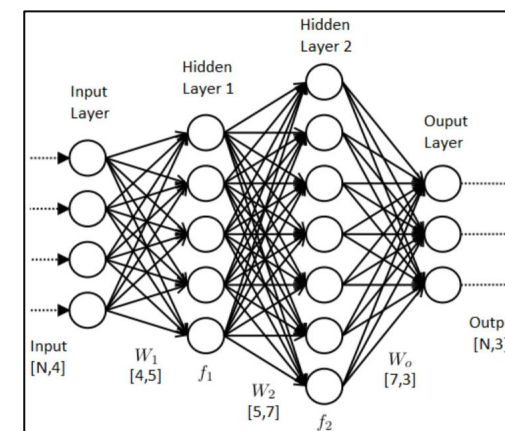
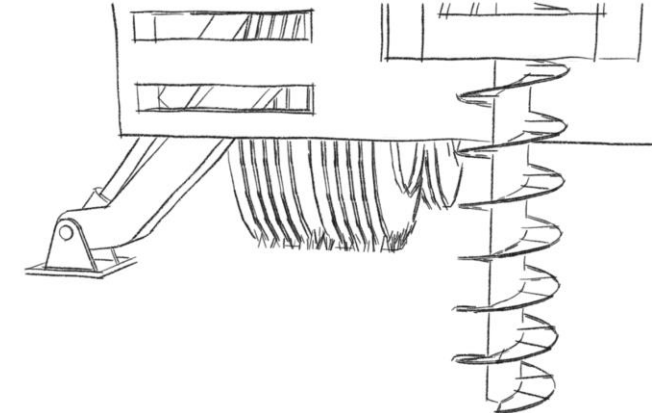
Supervised Learning

Pros:

- After training you can immediately quantify the accuracy
- Model is ready to go right after training
- You can turn discrete data sets into continuous data

Cons:

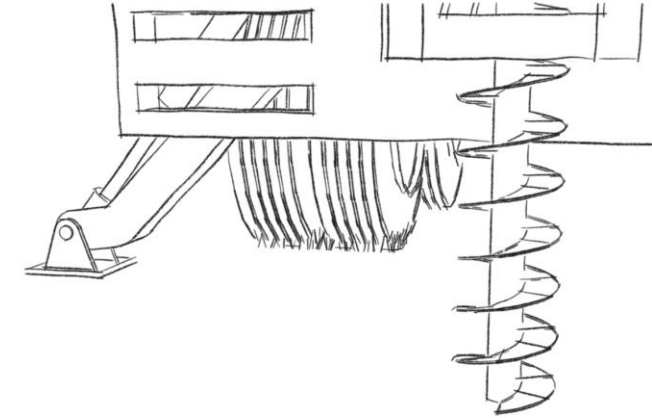
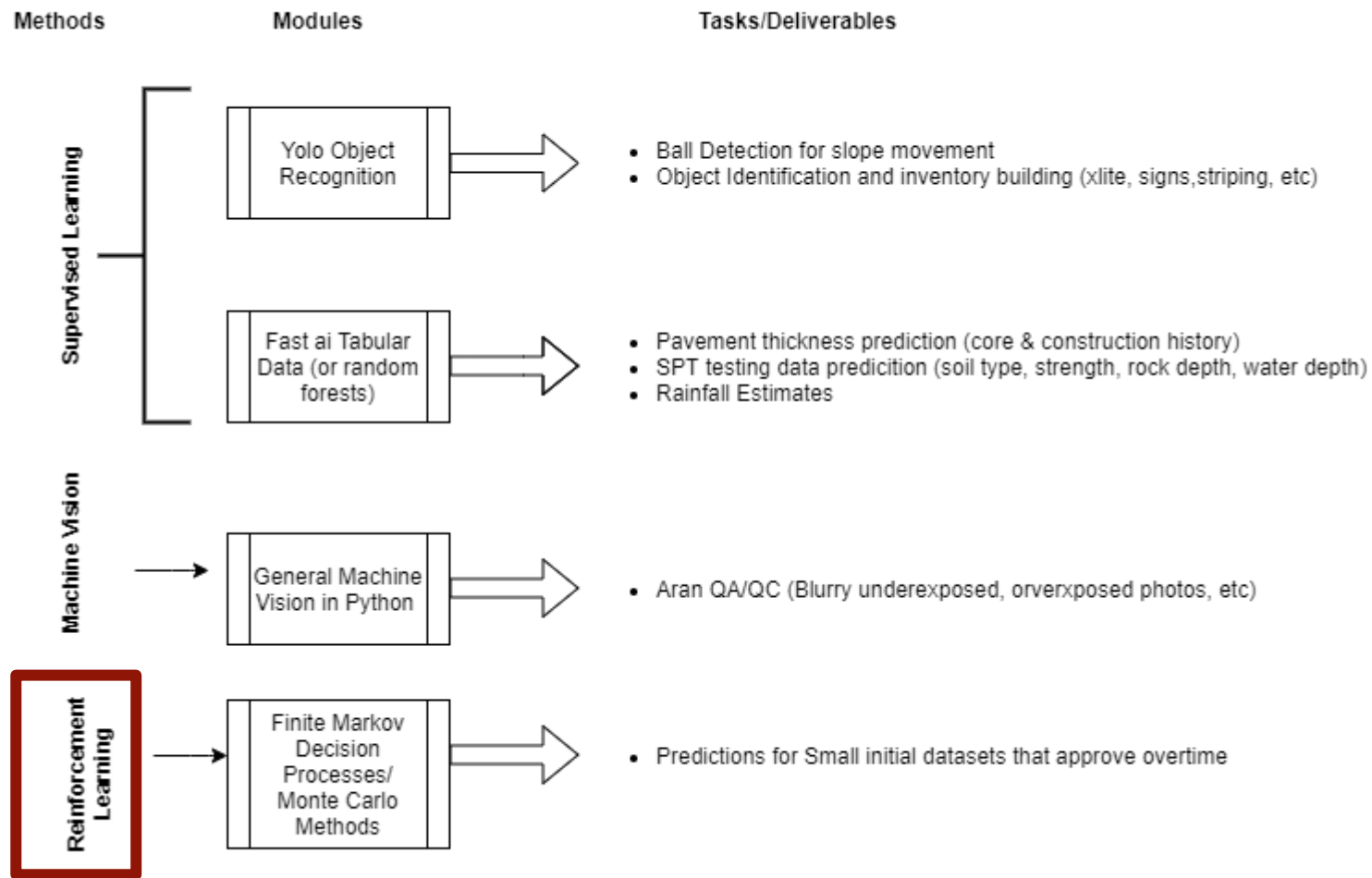
- Requires very large training sets (transfer learning can help for specific data sets))
- Most of the development time is spent finding and cleaning historic data
- Requires retraining on a routine basis resulting in static models between training sessions

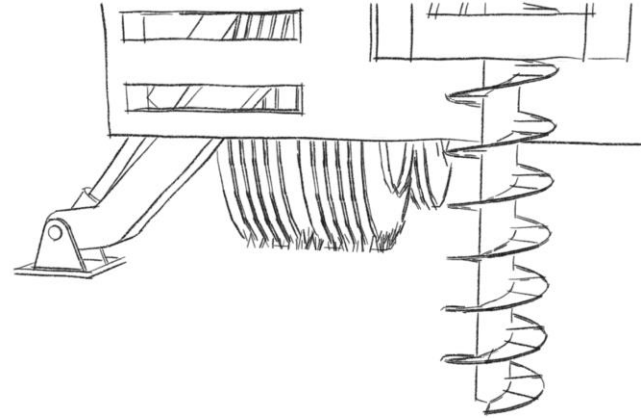


Neural Net Based

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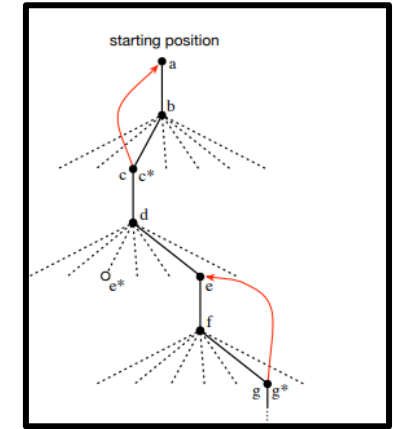
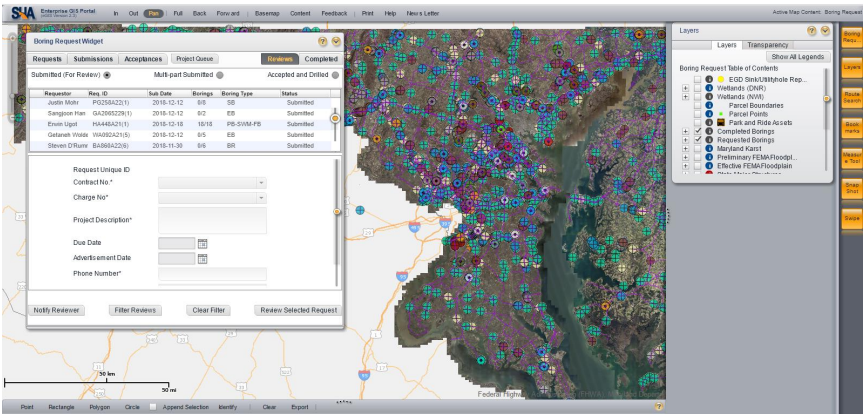
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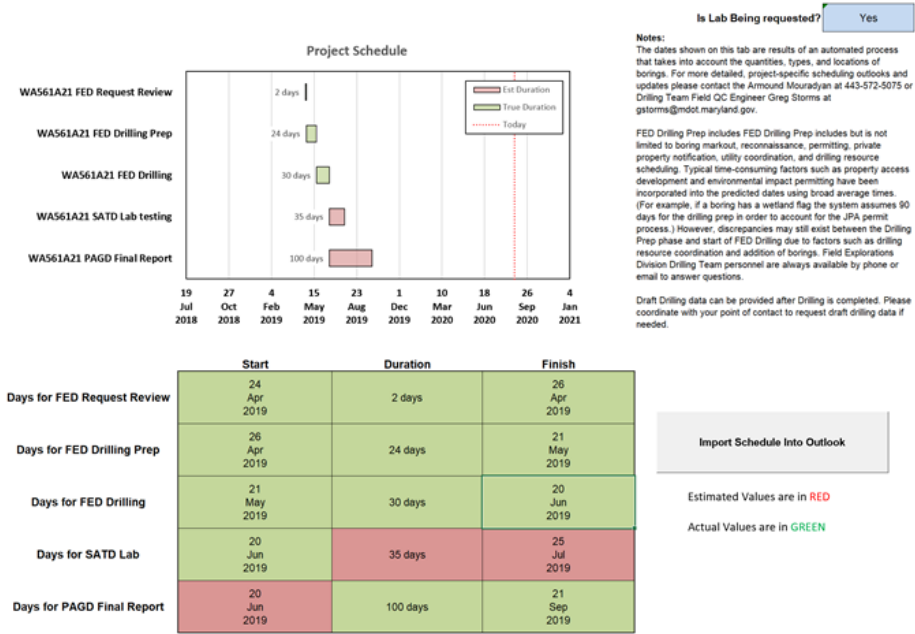


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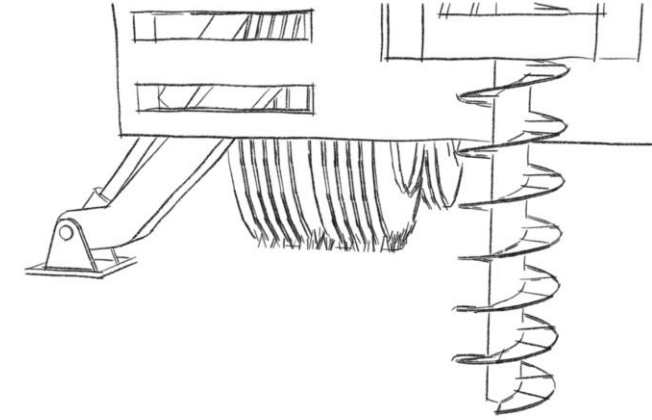
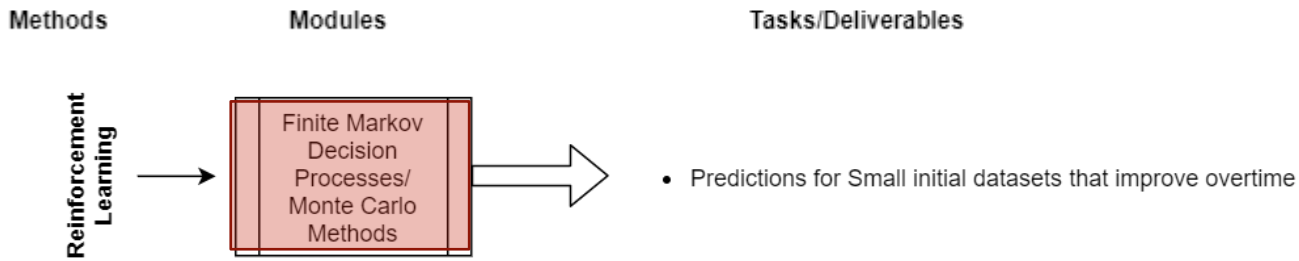
System makes a prediction drilling data and anticipated schedules based on historic data and learns form the result.



Customer Makes a New Request for Soil SPT Data

Provides customer with a predicted project timeline based on the unique project values. (Project Location, drilling quantity, time of year, recent productivity)

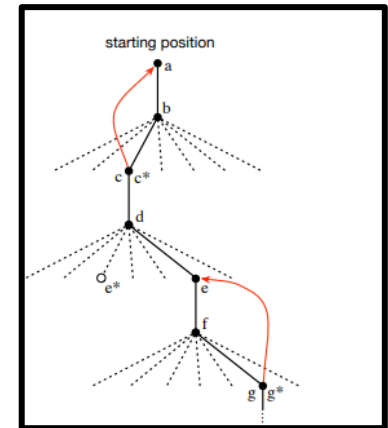




Reinforcement Learning

Pros:

- Model is trained after each prediction, and does not require scheduled updates
- Works with small datasets that grow overtime
- Best for building predictions for processes that quickly change over time
- Not a black box and is easier to understand and set logical starting values.
- Example: Estimating field testing delivery dates. (quickly changes based on available resources)



Recursive process that balances estimation and exploration over time

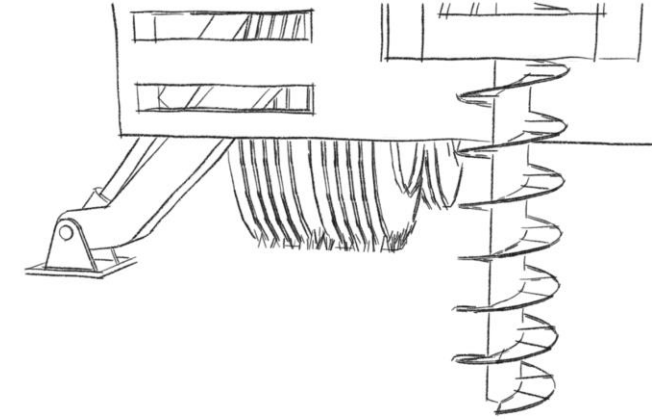
Cons:

- Unless logical values are set Initially, at the beginning the models will appear unintelligent as training/exploration occurs



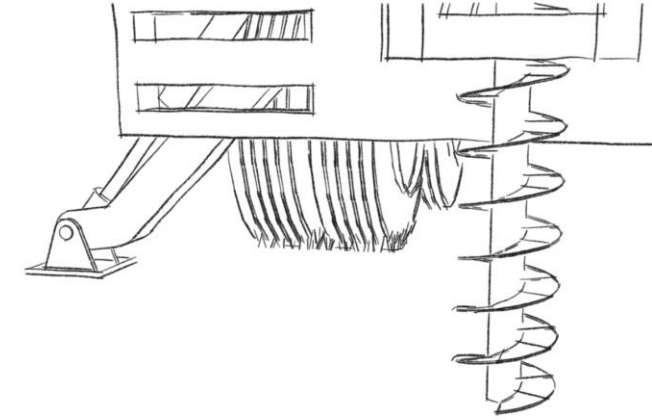
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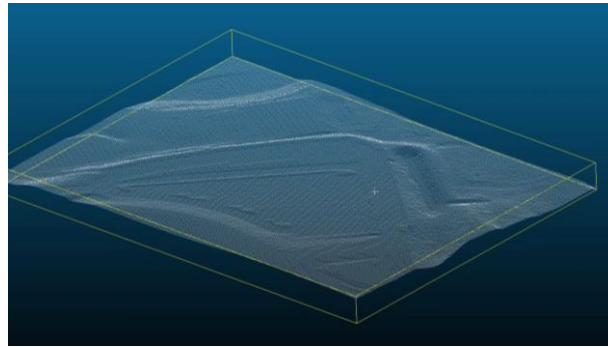


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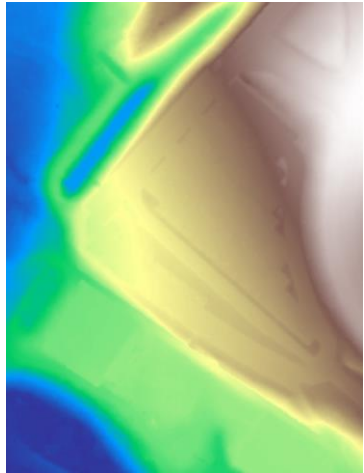
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xyz (point cloud)



Xyz (DEM)

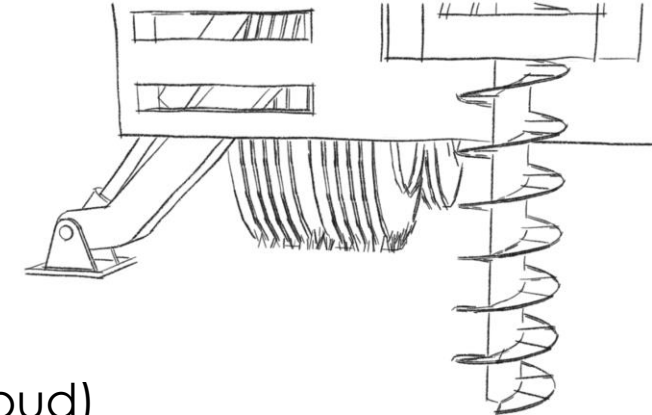


xyrgb (satellite Imagery)

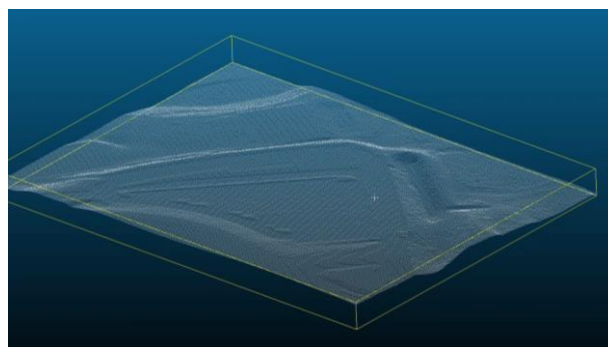


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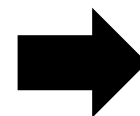
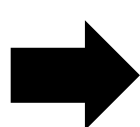
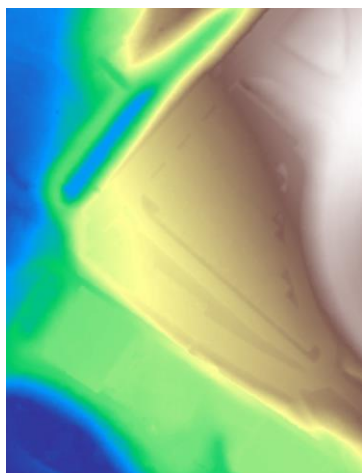
xyz (point cloud)



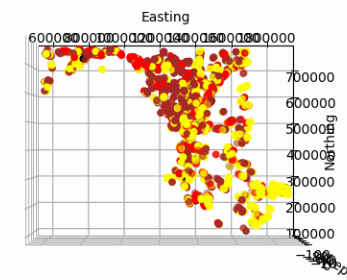
xyzrgb (point cloud)



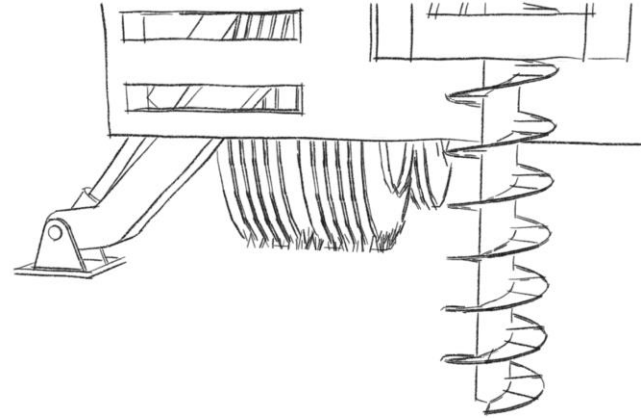
Xyz (DEM)



xyrgb (satellite Imagery)



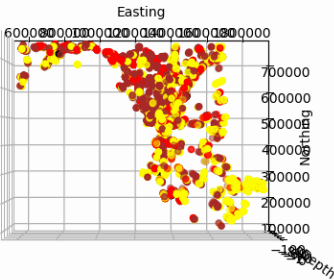
Machine Learning xyz(var)



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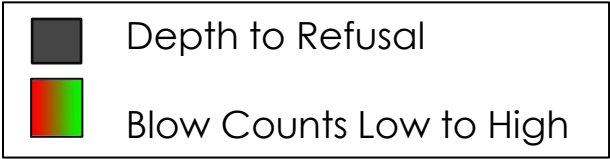
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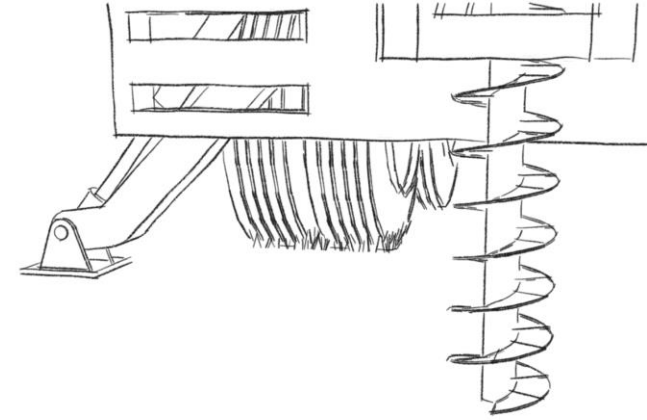
xyzrgb (point cloud)



Machine Learning xyz(var)

Xyzrgb+Machine Learning xyz(var)





Where do we go from here?:

Geosetta is looking for public and private agencies that are interested in partnering.

Please contact us if you are

- A DOT personnel who can streamline the process of making its Geotechnical test data available.
- You are at an agency or company who would value having access to a dedicated custom portal for your exploration data in a GIS tool.

Email us at info@geosetta.com



Geosetta