

A photograph of a forest path in autumn. The path is covered in fallen brown leaves and leads into a misty, sunlit forest. Tall, thin trees line the path, and the sunlight creates a warm, golden glow in the distance. The overall atmosphere is serene and slightly mysterious.

The digital caliper, - how the AR-technology will change the forestry sector

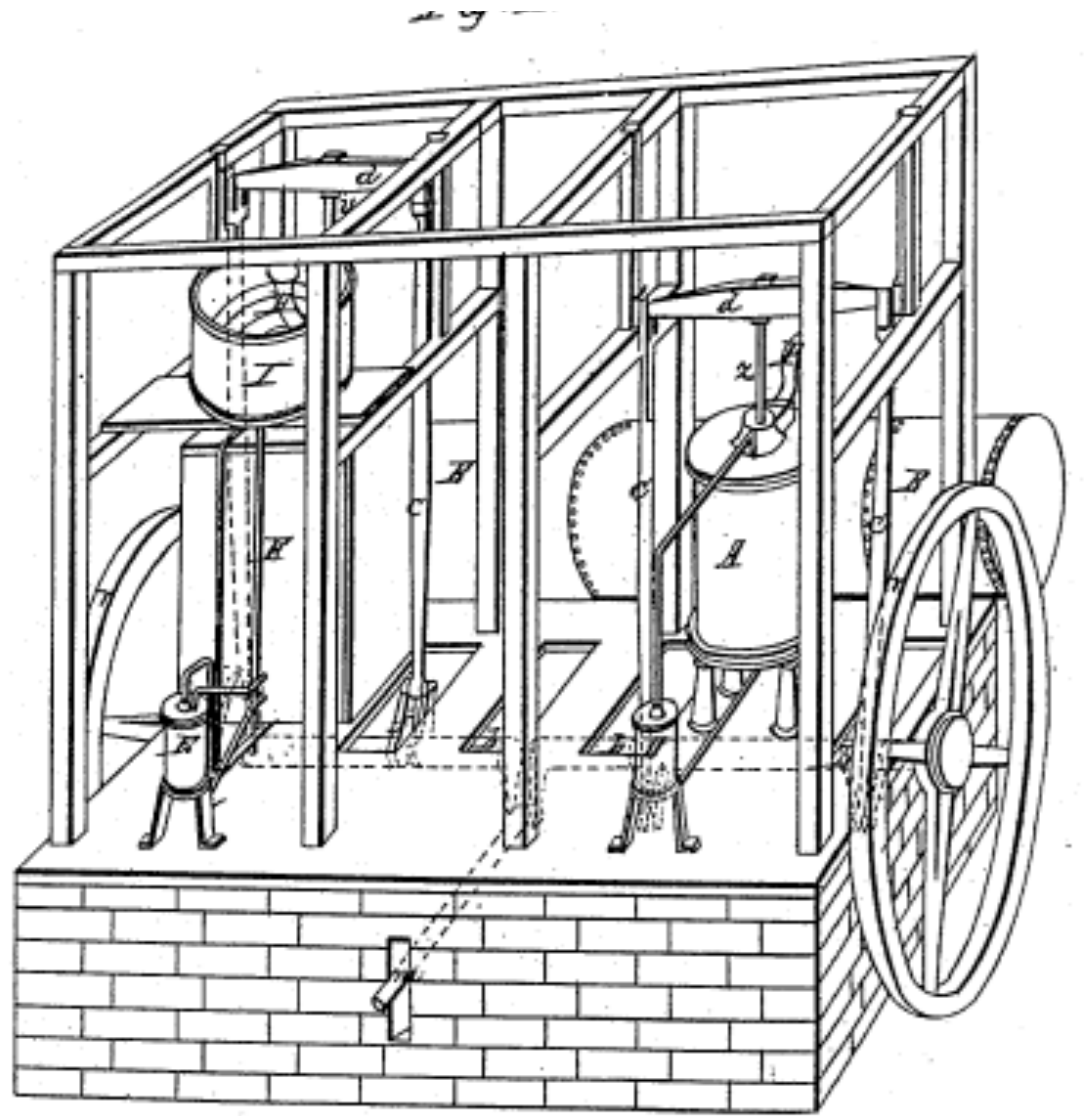
Johan Ekenstedt, CEO Arboreal
Johan.Ekenstedt@arboreal.se
www.arboreal.se





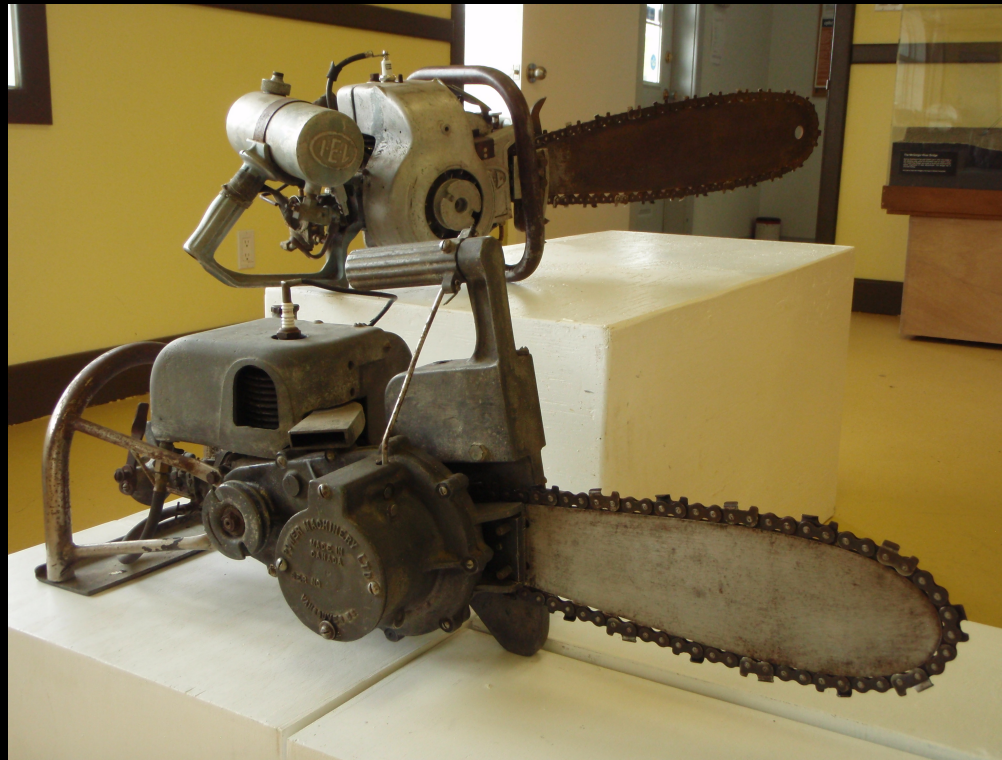
By John Boyd - This image is available from the Archives of Ontario under the name reference code E 73845, Public Domain.







What about disruption in forestry?



What about disruption in forestry?



Idea:

- Measure forests with AR-technology



Technology

- AR – technology creates a local 3D-map in real-time



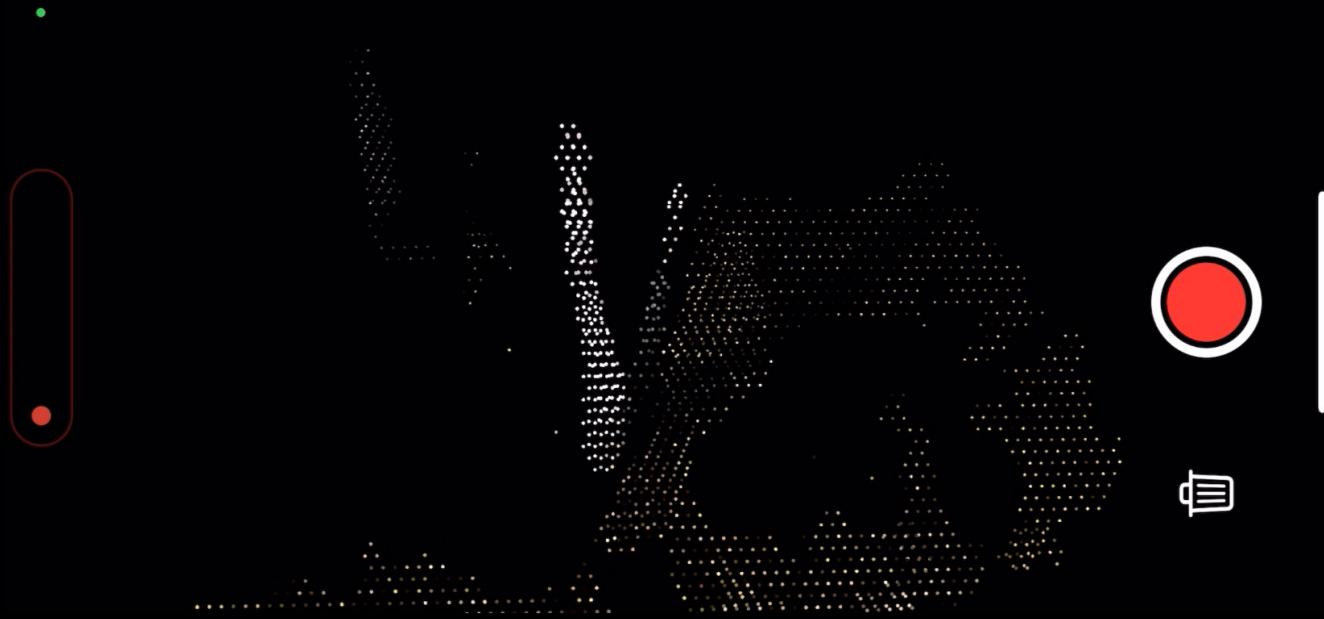
Technology

- AR – technology creates a local 3D-map in real-time



Technology

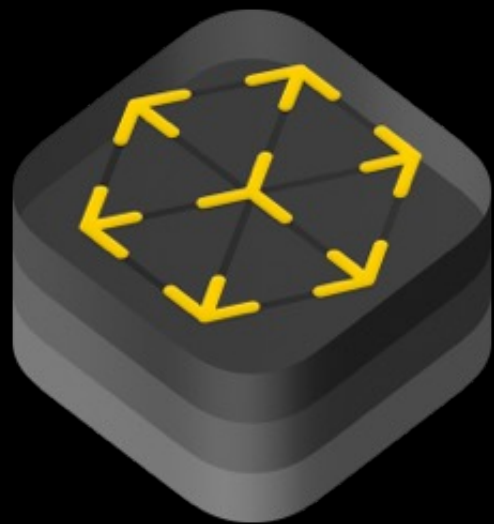
- Lidar – technology, high definition 3D-data



Background



Background



iOS 2017

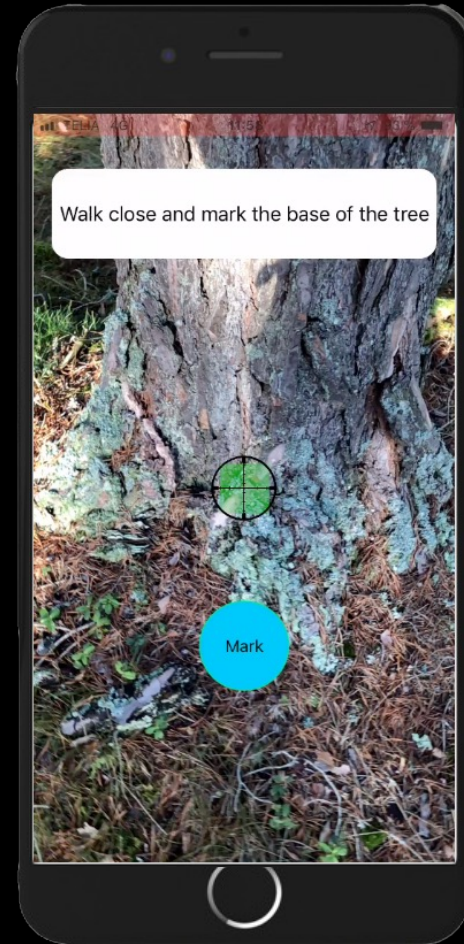
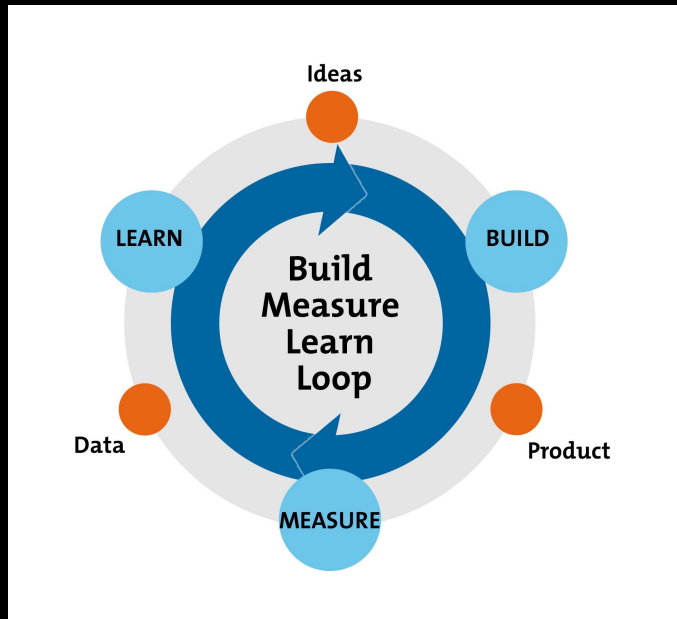


Android 2018

How do you take an idea to reality?



Arboreal Tree – first version





Arboreal Tree

- iOS, Android
- Measure single trees
- Height, crown width and crown height

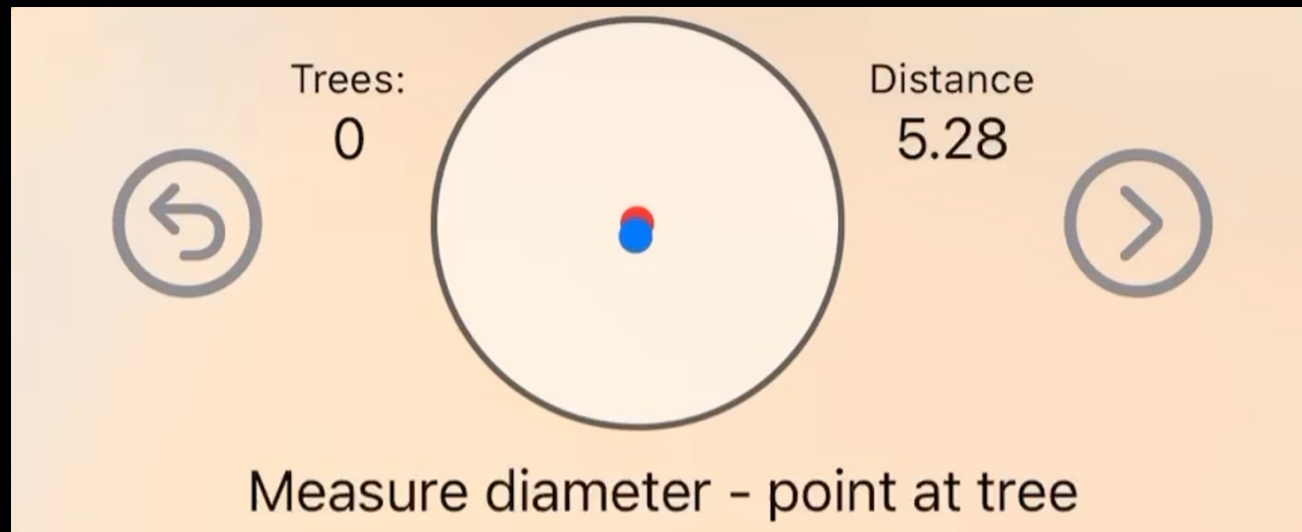


Arboreal Forest

- iOS
- Measure sample plots
- Diameter, Basal area, Volumes, Trees per ha, Heights.
- Save data in the cloud

Arboreal Forest

- AR – technology creates a local 3D-map in real-time



Technology

- Measure diameter



Technology

- Add data to a tree

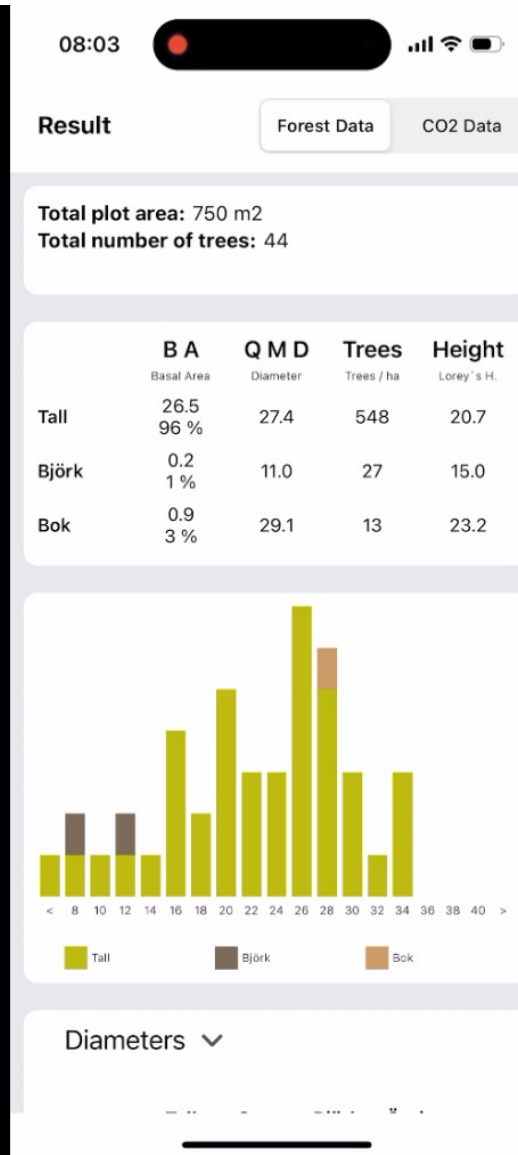


Technology

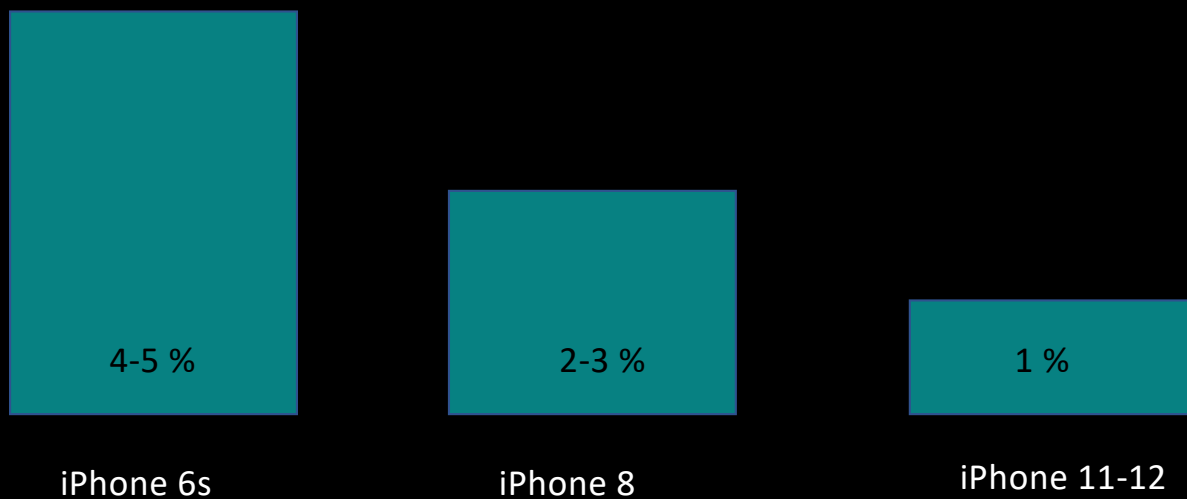
- Measure the height of a tree



Result



Error of AR-technology is decreasing

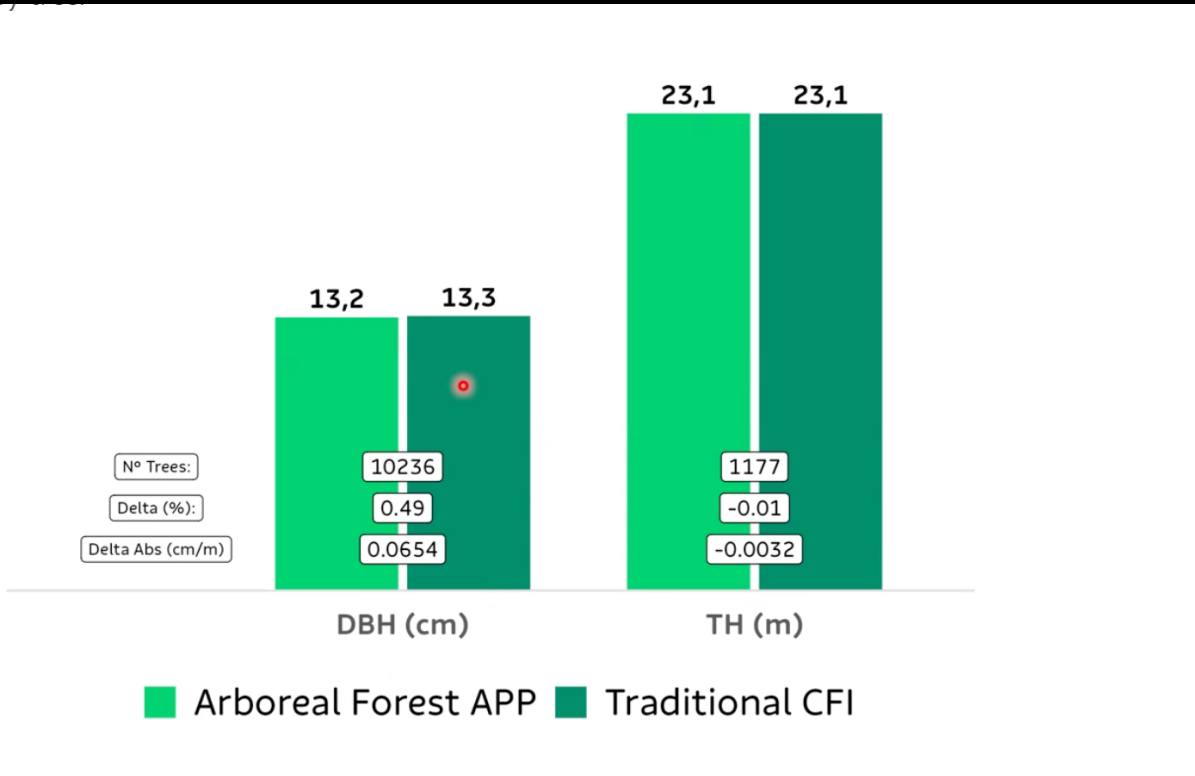


RMSE, Distance (10-20 meters)



Evaluation

	Traditional	Arboreal
Diameter (basal weighted)	- 1,23 cm (- 4,5 %)	+ 0,84 cm (+ 3,0 %)
Volume (m ³ sk / ha)	+ 18 m ³ sk (6 %)	- 4 m ³ sk (- 1,4 %)
Basal Area	+ 2,0 m ² (+ 6,8 %)	+ 1,0 m ² (+ 3,4 %)
Trees	+ 92 / ha (- 14 %)	+ 25 / ha (+ 4 %)
Average tree volume	- 0,05 (- 11 %)	- 0,02 (+ 4 %)



Arboreal Forest works best with Lidar



Live demo



Test next version of Arboreal Forest



Roadmap Arboreal

- New version of Arboreal Forest in May 2023
 - Plot without border
 - Measure many stems on same tree (Coppice)
 - Minimap



Roadmap Arboreal

- Scan single trees with Lidar



Future of AR?





FOREST
MAPPING
MANAGEMENT



Measure in the app Arboreal Forest
Data available in FMM:s solution





Johan Ekenstedt, CEO Arboreal
Johan.Ekenstedt@arboreal.se
www.arboreal.se



John-John Markstedt



Johan Ekenstedt