Tree Locomotion Robot

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Is there another way to do forestry?

- Keep people safe
- Protect the soil
Tree felling ergonomics analysis

Data collection ensemble for tree fallers

Video recorder

Video cameras
Felling and using a wedge
What can we learn from the mining industry?

- Develop radical new machines!
Mining machine with no cab
Much thinking ...
Brachiation

- Develop radical new machines!
Forestry machine with no cab
Radical machine
University of Canterbury – talented students

Axes rotation XYZ position

Transformation matrix from Joint n-1 to joint n

\[ n^{-1} T_n = \begin{bmatrix} \cos \theta_n & -\sin \theta_n \cos \alpha_n & \sin \theta_n \sin \alpha_n & a_n \cos \theta_n \\ \sin \theta_n & \cos \theta_n \cos \alpha_n & -\cos \theta_n \sin \alpha_n & a_n \sin \theta_n \\ 0 & \sin \alpha_n & \cos \alpha_n & d_n \\ 0 & 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} R \\ T \end{bmatrix} \]

\[ 0T_3 = 0 \cdot T_1^1T_2^2T_3 \]
Wireless control
Battery powered & wireless control
Tree-to-tree robot
Mining experience
- Robot effect on jobs
  - Less operators
  - More maintenance staff
    - Highly complex systems requiring upkeep
  - More data staff
Potential problems and Human Factors

- Forestry is an outdoor occupation
- Sedentary office task
- Disconnect from reality
- Loss of situational awareness
- No travel
- Interaction with work mates
Where to now?

Locate funding to build a prototype thinning machine to demonstrate to machine manufacturers

Philosophy

• small, light robots – easily transportable
• less financial cost per unit
• less risk for contractors
• collaborative robots – one cuts tree, one pushes tree
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- University of Canterbury