PETALS: Improving Learning of Expert Skill in Humanitarian Demining

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war between Tamil Tigers and Sri Lankan army

1983–2009
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Photo: Devaka Seneviratne
6,461 casualties in 2015 in 61 countries
78% were civilians
38% were children

Source: Landmine Monitor 2016
DANGER MINES!

Photo: Adam Jones
Lahiru’s Mission:
Use the power of Computer Science to improve the safety and efficiency of humanitarian landmine clearance
Landmine Clearance Basics

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Expert Approach: Metallic Signature Method

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Key Idea: Visualize Metallic Signatures
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Approach 0: Support Deminer in the Field
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- Camera
- Display
- Trigger
- Color patch
Approach 0: It Works! But...

Approach 1: Scaffold Trainees’ Learning
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Approach 1: Lessons Learned

- Real-time visualizations were not effective

- PETALS allowed instructors to monitor performance of multiple trainees simultaneously

- PETALS allowed instructors to communicate personalized process feedback after completion of each practice lane
Approach 2: Support Instructors
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Instructor console
Overhead camera
Tracking computer
Training lane
Instructor console
“I can walk up here [to the instructor console] and within 2 seconds I can say, ‘he doesn’t need anymore help’, ‘he doesn’t need anymore help’ ... or ‘this guy might need help’.”

—an HDTC instructor
Approach 2: Support Instructors
Summative Evaluation
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1. Initial lecture
Summative Evaluation

2. Training
Summative Evaluation

3. Exam
1. Initial lecture
2. Training
2. Training
3. Exam
Take Aways

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- Real time visualization of metallic signatures increased cognitive burden on trainees instead of reducing it.
- Visualization helped trainers provide trainees with immediate and personalized process feedback.
Innovation = Invention + Implementation