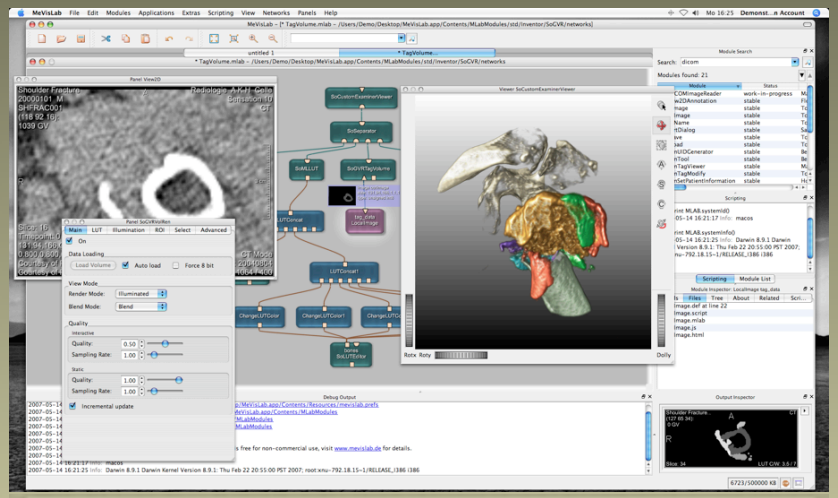
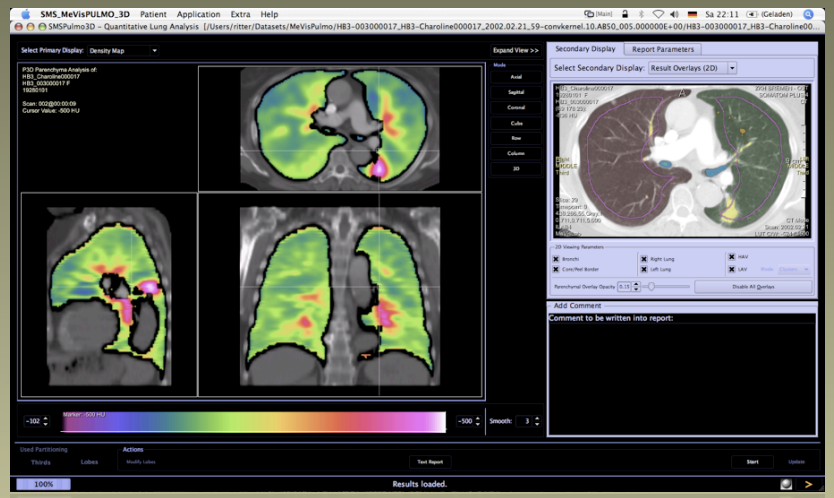
Prototyping and Algorithm Integration in Medical Visualization





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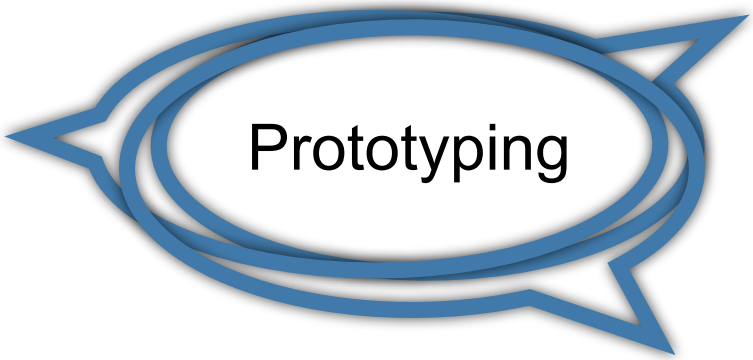
Outline

- Prototyping
- Visual Programming Platforms
- Requirement Analysis
- Levels of Integration
- Prototyping Example

Prototyping in Medical Visualization

Innovation in medical visualization requires close collaboration between…

Researchers



Clinical users

Developers

Prototyping serves as a common language

Requirement Analysis 1

Research

- variable scenarios
- »expert« parametrization
- fast changes
- little testing

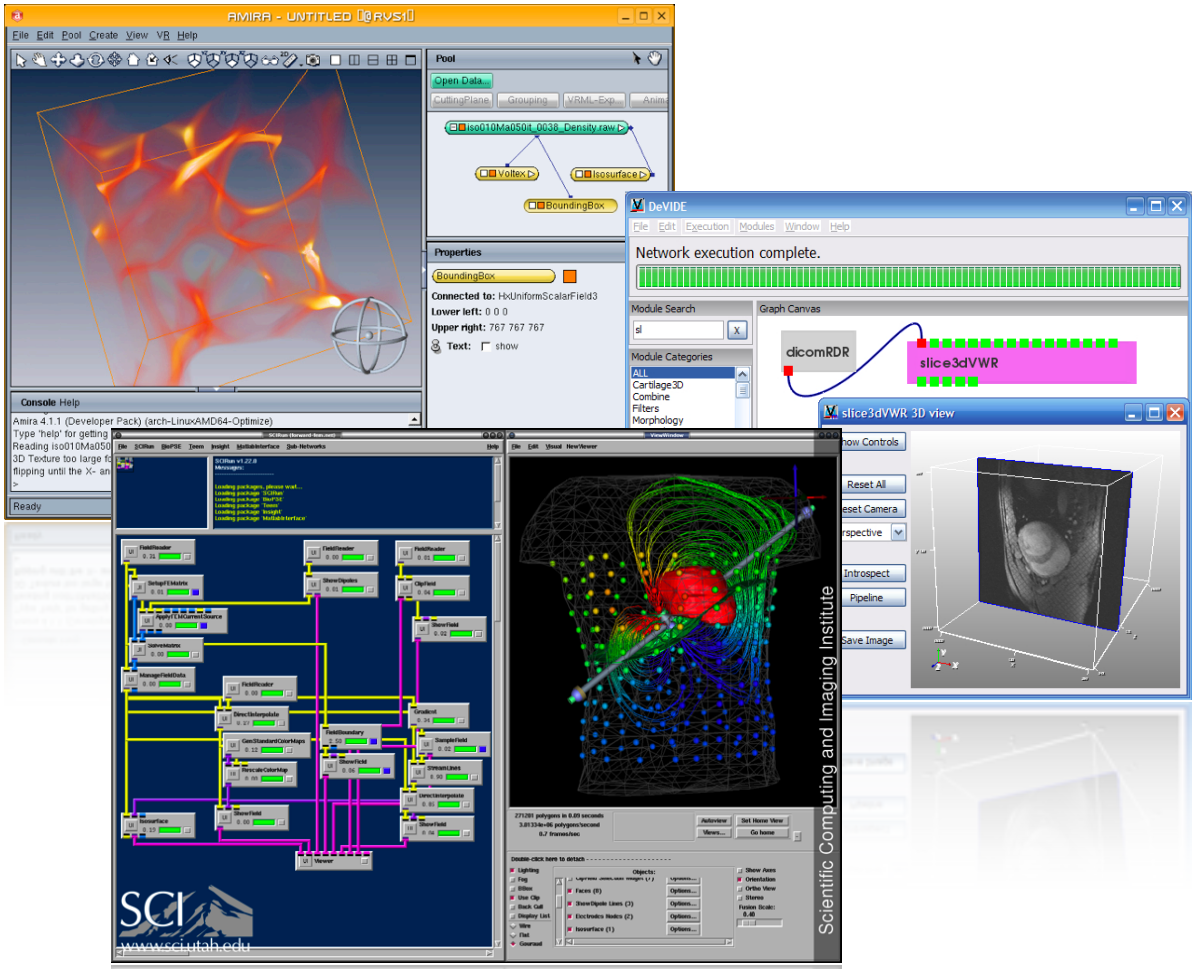
Clinical use

- efficient workflow
- easy handling
- standardization
- stable execution

Prototyping platform should provide commonly required features

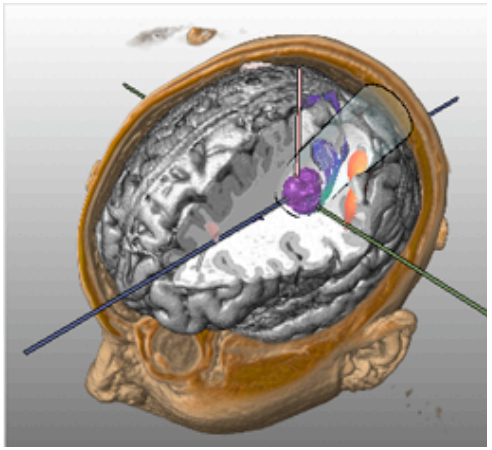
Visual Programming / Prototyping Platforms

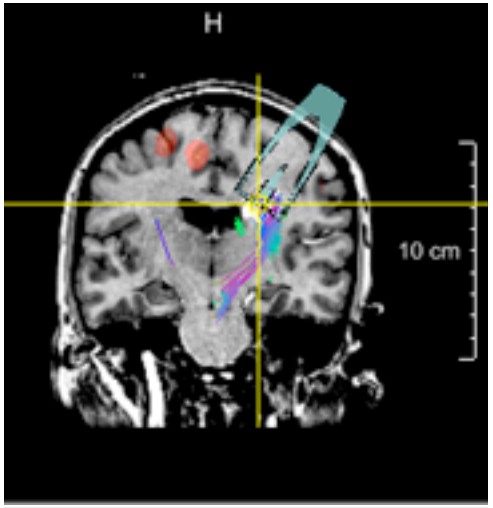
- AVS Express
- Amira
- DeVIDE
- SCIRun
- MeVisLab



Requirement Analysis 2

- Import and export of medical image data (DICOM)
- Coherent visualization of data in 2D and 3D
- Interaction support in 2D and 3D
- Combined Volume and Surface Rendering
- Powerful imaging and graphics frameworks that interact
- GUI building support, scripting to add dynamic behavior





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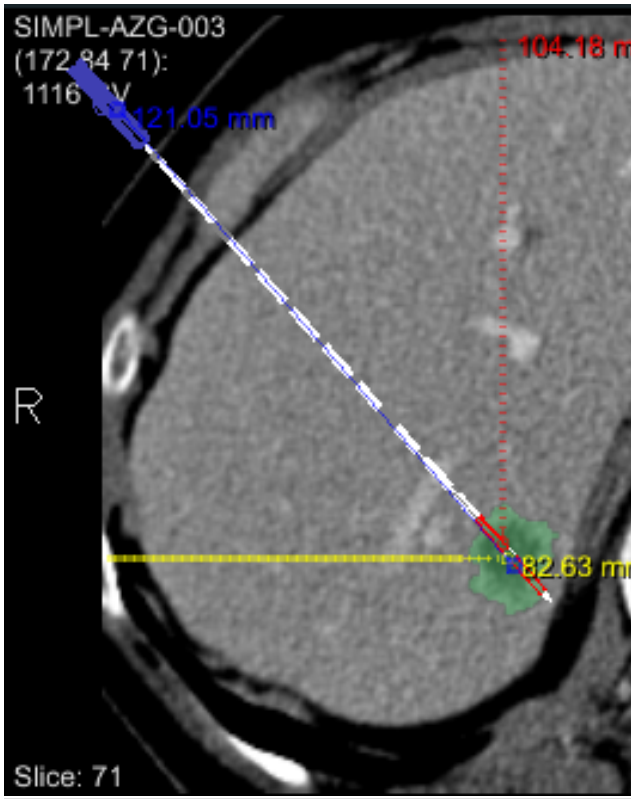

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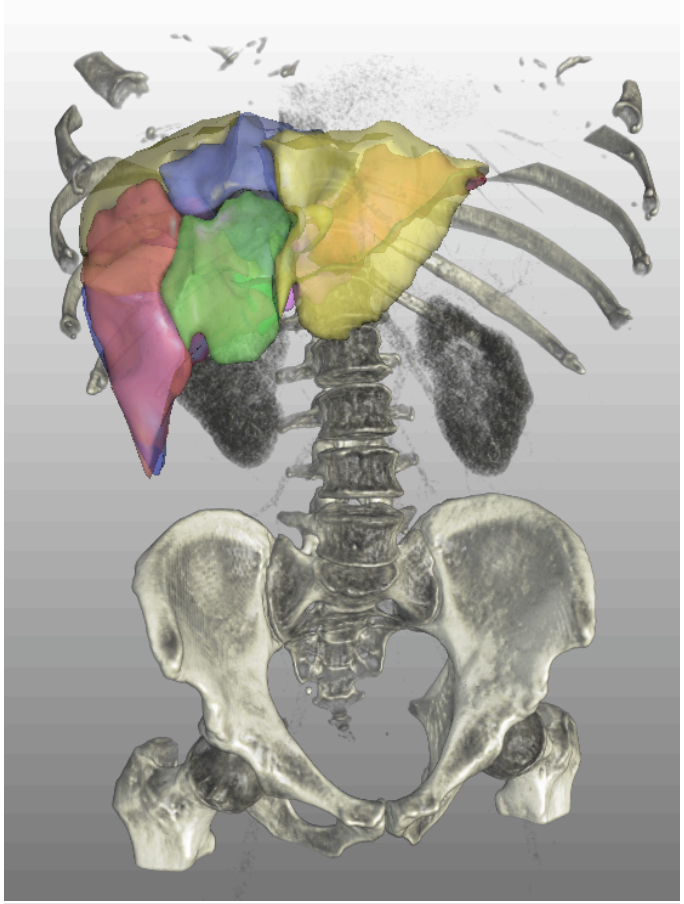

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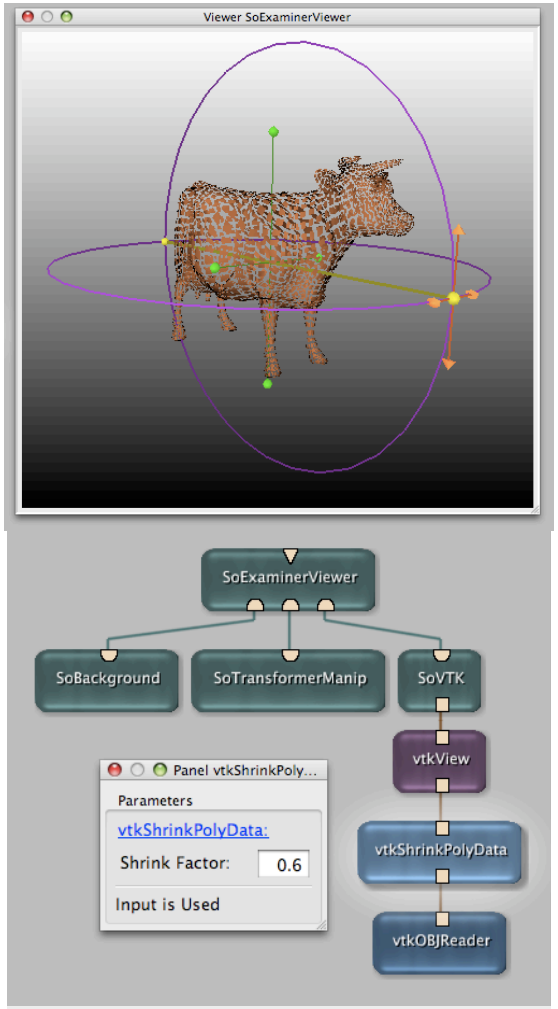

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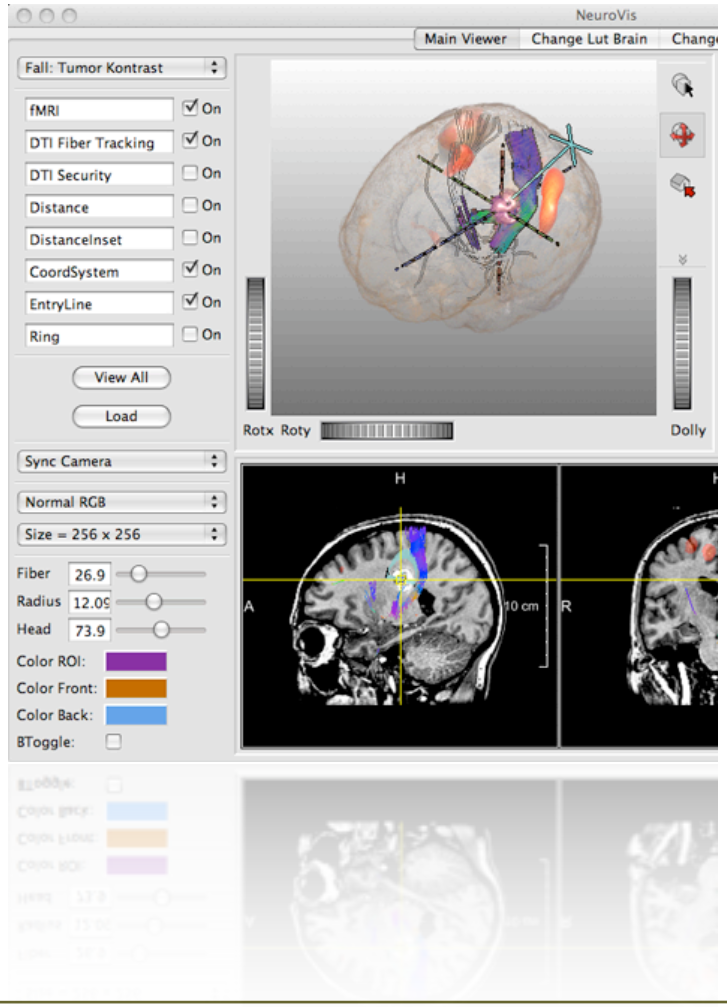
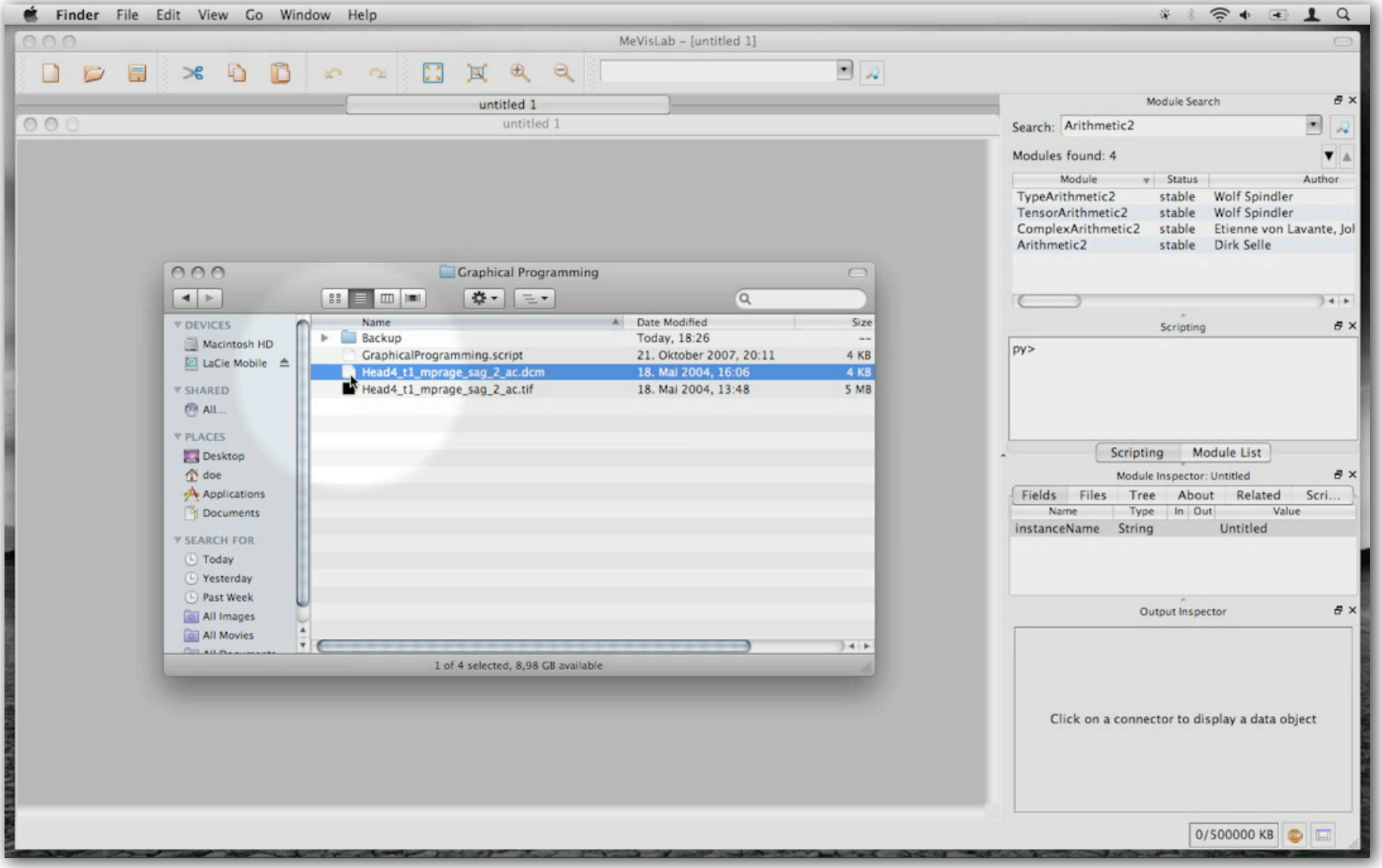


Integration at different levels

- low-level (*Module level*)
  - High performance implementation of core functionality
  - Build on powerful frameworks
- medium-level (*Network level*)
  - Combine low-level algorithms to form complex algorithms visually
  - Build on a rich algorithm library
- high-level (*Application level*)
  - Design and build user interfaces
  - Hide network complexity

Prototyping a Small Filter Application



Conclusion

- Visual prototyping facilitates the communication between clinical users, researchers, and developers
- Using a prototyping platform accelerates the exploration of algorithms in clinical settings
- Leveraging the powerful base functionality allows you to concentrate on your own innovative concepts