



MICRO GENESIS

FROM CLINIC TO HOME:

A Scalable Neurorehabilitation Platform Powering Stroke Recovery

CLIENT OVERVIEW

A Singapore-based medical healthcare company specializing in R&D for physio-neuro software solutions, focusing on stroke rehabilitation via mind-body paradigms. The client operates therapy centers across major Indian cities and sought to leverage real-time attention-muscle coordination technology to enhance neuroplasticity outcomes.

THE CHALLENGE

The client faced three core challenges in translating their research into a clinical application:



Complex Signal Processing:

- Required real-time processing of analog EEG/EMG signals ($\leq 70\text{mV}$) from 8 head/arm sensors into digital data.
- Needed advanced DSP expertise for time-domain filtering and sampling.



Scientific Application Gaps:

- No unified platform for therapists to prescribe exercises or track progress using neuroscience principles.
- Patients lacked guided rehabilitation tools.



Fragmented Data Management:

- Decentralized patient records hindered progress analysis.
- No secure synchronization for therapy data across clinics.

OUR APPROACH

MicroGenesis helped to develop a precision scientific application combining hardware integration, real-time analytics, and clinical workflow management:



Real-Time Signal Processing & Visualization

- ✓ **Hardware Integration:**
8 sensors attached to the patient's head/arm captured EEG/EMG signals during therapy sessions.
- ✓ **DSP Architecture:**
Analog signals → Sampled via a circuit → Time-domain filtered → Stored in SQLite (lightweight DB).
- ✓ **Sci-Chart Implementation:**
Rendered millions of data points into high-accuracy real-time graphs for therapist analysis.



End-to-End Clinical Platform

- ✓ **Therapist Features:**
 - Session Planning Module: Prescribe personalized exercises.
 - Reporting: Track patient progress via real-time dashboards.
- ✓ **Patient Features:**
 - Play Module: Guided rehabilitation exercises with real-time biofeedback.
 - Learn to Play Module: Training for home-based therapy.
- ✓ **Centralized Data Sync:**
Secure cloud integration for patient records, subscriptions, and therapy history.






Technical Implementation:

- ✓ **Framework:**
WPF (C#/XAML) for high-performance desktop deployment.
- ✓ **Value-Adds:**
 - Simulators for device-free testing.
 - Cross-platform portability (clinics or home laptops).

THE BUSINESS IMPACT

MicroGenesis helped with transformative outcomes in stroke rehabilitation:

	AREA	IMPACT
	Therapy Efficiency	End-to-end solution for consultation, prescription, progress tracking, and reporting—reducing manual oversight.
	Data Centralization	Secure, scalable repositories for users across clinics, enabling unified treatment planning.
	Accessibility	Patients could train remotely via a portable Windows application, increasing adherence.



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